The Milbank Memorial Fund

QUARTERLY

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Vol. XVII JANUARY 1939 No. 1

Edited by the Technical Staff

Published quarterly by the MILBANK MEMORIAL FUND, 40 Wall Street, New York, New York. Printed in the U. S. A. Subscription: $1.00 a year

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IN THIS ISSUE

Although the summer season is the most favorable for obtaining an adequate diet at low cost, a survey of relief families in Washington, D. C., in July, 1938, disclosed that the food supply of many families at the time of the survey was insufficient in quantity and did not provide all the needed nutritive elements. This investigation by the United States Public Health Service is described in "Summer Diets of the Poor in Washington, D. C.," by Dorothy G. Wiehl and Carroll E. Palmer. The findings of this study are in accord with those from other investigations of the dietaries of low-income families. The method of the survey is of more general interest because it presents a simple method for a rapid, large-scale survey to provide current data on family dietaries in a community.

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What type of service does the public health nurse perform in the tuberculous family? Since public health nursing constitutes a substantial part of the present program for the control of tuberculosis, the answer to this question is of considerable interest. In the article, "A Study of Public Health Nursing Service in Tuberculous Families in the Mulberry District of New York City," by Miss Jean Downes of the Fund's staff and Miss Clara R. Price, R.N., Director of the Nursing Staff of the Mulberry Health Center, the various types of nursing service rendered in tuberculous families in the Mulberry district are described and are evaluated in relation to the main objectives of the public health nursing program in tuberculosis. It is believed that such an appraisal affords some indication of the value of the nursing service.

E.K.

Past studies have indicated that roughly of the order of 18 per cent of native white urban couples of completed fertility are without offspring, but these leave unanswered the question concerning the extent to which such childlessness is voluntary and the extent to which it represents physical inability to have children. In an article, "Voluntary and Involuntary Aspects of Childlessness," Clyde V. Kiser of the Fund's staff presents results from an investigation of a small but apparently fairly representative group of white childless couples in New York City. The core of the analysis concerns the extent of contraceptive practice among 291 wives reporting that they were never pregnant although they had been married ten years or more and were under 40 years of age at the time of marriage.

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Studies of contraceptive practice in selected population groups have indicated that, for the groups studied, differences in the prevalence and effectiveness of contraception were factors of the greatest importance in variations in fertility.

"Birth Control in a Midwestern City" by Regine K. Stix, M.D., the first of a series of articles on the clinics of the Cincinnati Committee on Maternal Health, discusses the effect of contraception on the fertility of clinic patients before they applied for instruction at the clinic. In this group, as in others differently selected, birth and pregnancy rates differed by social class. The differences in rates were due mainly to differences in contraceptive practice.

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The chronic diseases and defects of adult life are matters of increasing concern to health workers. In the study of these problems the emphasis has been largely upon the clinical and laboratory approach. In "Elevated Systolic Blood Pressure in a Rural Population," Dr. Ralph E. Wheeler has explored the extent to which field studies may offer solutions to the question of the prevalence of high blood pressure in a group of essentially well persons, and to the question of what other medical findings occur more commonly in persons with high blood pressure than in others.

SUMMER DIETS OF THE POOR IN WASHINGTON, D. C.

DOROTHY G. WIEHL AND CARROLL E. PALMER[1]

DIETARY surveys of families can contribute much useful information on such questions as the adequacy of the food supply and the frequency of types of deficiencies in the diets of various groups in our population. Such investigations reveal with considerable accuracy the dietary habits of the families studied, and identify families which are not obtaining enough of various types of food to ensure protection against dietary deficiencies. It is obvious that a dietary survey alone will not discover existing cases of specific dietary deficiencies, nor is it usually practical to obtain sufficient information to estimate closely the nutritive requirements for each family. However, records of food consumption will identify families which are subsisting at the time of the survey on a food supply definitely below average requirements and therefore are potential sources of cases of malnutrition or deficiency diseases, and of underdevelopment and retarded growth in children. Improvement in the dietary level of such families must be the objective of a preventive program which is not limited to the restoration of normal nutrition in persons showing signs of malnutrition or undernourishment. The collection of data to define the character of substandard diets and the factors which affect the dietary level and choice of foods will afford information basic to developing a program to improve the adequacy of diets.

Numerous investigations of the food supply of families in different income groups have been made and have revealed the general pattern of the American dietary. These have shown that, as family income decreases, the total amount of food consumed de-

[1] Respectively, member of research staff, Milbank Memorial Fund, and Passed Assistant Surgeon in charge of Child Hygiene Studies, Division of Public Health Methods, National Institute of Health.

clines, with the result that the caloric intake diminishes and the quality of the diet becomes poorer from a nutritional standpoint. It appears also from several studies that individual families with the same income show wide differences in the amount spent for food and in the choice of foods. Many families have poor diets although the expenditure for food is sufficient to purchase an adequate, well-balanced food supply. However, the lower the income, the greater is the likelihood that the diet will be unsatisfactory, especially with respect to inclusion of all needed elements for good nutrition and growth of children. The information available on the diets of families with very low incomes is such that real concern for the nutritional health of the millions of persons living on various types of public assistance is expressed frequently by those who have studied such evidence.

A special survey to obtain current information on the adequacy of diets of relief families in Washington, D. C., was conducted in the summer of 1938 by the United States Public Health Service with the cooperation of the Milbank Memorial Fund. Although extensive dietary surveys of low-income families were made in 1935-1936 by the Bureau of Home Economics of the Department of Agriculture, in cooperation with the Department of Labor and the Works Progress Administration, no relief families were included in these surveys. Data on diets of the lowest income groups give indirect evidence on the dietaries of relief families at comparable income levels, but the present survey was undertaken to supplement this evidence with an investigation of several relief groups.

Plan of Study. The plan for this investigation was affected by several considerations which led to the development of an experimental technique for recording diets of families. These considerations were, in brief, a desire to study a representative sample of both Negro and white families which were recipients of different types of relief available in Washington, to compare these families with nonrelief families, and to make the results of the survey available

as quickly as possible. It was decided that 600 families should be the minimum studied, as this would provide 100 families in each of the categories to be included, namely, white and Negro families on the W.P.A. list, families aided by the Public Assistance Department, and self-supporting families. Neither funds nor the staff of trained workers required were available to obtain diet records for this number of families by such intensive methods as weighing foods in the home or making inventories before and after a period for which daily records of purchases were kept by the housewife. A rapid survey which would give a cross-sectional picture of food consumption was chosen as a method that would yield sufficient information to reveal the dietary level of various groups of families. For this purpose, a meal-by-meal report of the food consumed by each family in a two-day period was decided upon for the dietary record.

The meal-by-meal record for a two-day period is a modification of the method of obtaining at a single interview a statement of all food purchased or of the amounts used in the past week. The weekly record of purchases has been utilized extensively for cost-of-living studies and has provided information on family food budgets. For an investigation of the family dietary, estimates of the amount of foods used during the week are necessary, especially for staple articles of diet bought in bulk. It was felt that the errors inherent in any report dependent on memory would be reduced to a minimum if the record were obtained for only two days, and the relatively short time required for each interview makes this method practical for large-scale surveys. The meal-by-meal record centers attention on the foods actually served rather than on purchases and is helpful in making estimates of the amounts of specific foods which were consumed. In giving an itemized account of each meal, and in describing certain dishes served, the informant is reminded of the use of some food items which might easily be forgotten.

One visit was made to each family during the period from June

27 to July 23 to obtain a record of all food consumed by the family in the two days preceding the investigator's interview. The schedule called for a meal-by-meal description of the foods served in these two days, with an estimate by the housewife of the amount prepared and the amount actually consumed by the family. For as many items as possible the housewife estimated the weight or volume of the foods prepared and reported the fractional part of the food eaten if all of it was not consumed. In some cases, the quantity was reported in package units for which the price was given. For a small percentage of the items, the housewife knew the price that she had paid but could not give the amount purchased; for these, estimates had to be made on the basis of price lists obtained from neighborhood stores. Little difficulty was experienced in obtaining such a meal-by-meal statement of the family diet for a two-day period.

Quantities of staple foods which enter into cooking, and certain accessory foods, such as butter and sugar, are not easily estimated for each meal. Therefore, a summary estimate of the amount used in the two days was obtained for the following foods: milk, sugar, bread, flour, cornmeal, butter, other table fats, lard, and other cooking fats. For home-made items in the diet, such as biscuits, cake, and pie, the recipe was recorded and afforded a rough check on the summary totals reported. The recipe or composition of mixed dishes, such as soup, stew, and salads, also was recorded to provide the necessary information about specific foodstuffs consumed.

The error introduced by the estimates of amounts of staple articles affects the caloric content of the diet most seriously and has slight effect on the evaluation of the availability of protective nutrients. Whether the error in reporting on staple items is greater or less than for the weekly record is not known. It is reasonable to assume that the error in reporting the two-day quantities is as likely to be too high as too low and that the average values for a group of families are as accurate as those based on weekly estimates.

Does the two-day record give data which are representative of dietary levels? The answer to this question must be considered with reference to the objectives of the study, and with reference to whether average values for groups of families are to be used or attention given chiefly to appraisal of the diet of individual families. In the case of average food values for a group of families, there is no good reason to consider the averages based on two-day records as less typical of a group than those based on weekly records, especially if the two-day periods studied include equal samplings of different days of the week and are not otherwise biased. Evidence on the period of investigation required to obtain representative data for an individual family is lacking. It is logical that the longer the period for which the diet is recorded, the more definite is the information about the dietary level and variety of foods consumed. The specific foods used will vary during a week, but how much this would affect the character of the diet is uncertain. For evaluating the diet of young children, Burke and Stuart[3] have used three-day records kept by the mother and have reported that dietary deficiencies noted agreed closely with blood findings. More variety from day to day enters into the diet of older persons but the nature of this and the extent to which it affects the general type of diet needs to be studied. Variability in the diet of the same family at wider intervals, especially at different seasons, also needs further study.

At present, the dietary data provided by family studies are important chiefly for indicating general types of diets purchased at different income levels or by various classifications of families, and for making broad classifications of diets with reference to whether they meet or fall markedly below certain standards for the various essential nutrients. Such analysis of individual family diets, whether based on a two-day record or a weekly record, gives evidence on the frequency of types of substandard diets and gives an indication of

[3] Burke, Bertha S. and Stuart, Harold C., M.D.: A Method of Diet Analysis. *The Journal of Pediatrics*, April, 1938, xii, No. 4, pp. 493-503.

the variability in food habits of different families at similar levels of income or expenditure, and therefore of the extent to which average amounts for any group are representative. Precise evaluation of the adequacy of the diet for the individual family and an appraisal of its effect on the state of nutrition of members of the family cannot be made from data on food consumption alone. This limitation applies to data obtained over long periods of observation for food consumption as well as to that for short periods.

The Sample. The 602 families included in this study were divided approximately equally between white and colored. Each racial group was subdivided into three groups of about 100 each and composed of: (1) families drawn from the files of the Public Assistance Department, (2) families taken from the payrolls of local W.P.A. projects, and (3) neighbors of the above families who were not receiving assistance. For convenience in making visits to the homes of these families, families were selected from the Public Assistance roll and W.P.A. roll who lived in the northwest section of the City. Names of persons receiving Old Age Assistance were not taken from the Public Assistance files, as it was planned to study diets of families only, and to exclude individuals or one-person families from the study. The relief families in the study may be considered a typical sample of those living in the northwest section and probably are representative of the City in general, but the non-relief families are selected from low-income families with one or more employed workers.

For each family visited a record was obtained of the amount of money received by each member of the family in the preceding two weeks, and inquiry was made as to any additional funds available for current expenses.

Income of Families Studied. Although the families in the survey were all in the low-income group, small differences in income at emergency levels may be expected to affect the adequacy of the diet. For each family, therefore, the weekly income was calculated and

Color and Relief Status	All Incomes	Weekly Income per Cost Unit				
		Under $2.67 I	$2.67-3.99 II	$4.00-5.32 III	$5.33-6.66 IV	$6.67 or More V
	per cent of families in specified income group					
Whites						
Public Assistance	100.0	12.9	40.6	33.7	9.9	3.0
W.P.A.	100.0	6.7	17.8	27.8	22.2	25.6
Nonrelief	100.0	7.9	7.9	9.9	13.9	60.4
Negro						
Public Assistance	100.0	32.7	50.4	14.2	2.7	0.0
W.P.A.	100.0	28.3	28.3	17.7	16.8	8.8
Nonrelief	100.0	21.4	21.4	17.9	11.9	27.4
	number of families					
Whites						
Public Assistance	101	13	41	34	10	3
W.P.A.	90	6	16	25	20	23
Nonrelief	101	8	8	10	14	61
Negro						
Public Assistance	113	37	57	16	3	0
W.P.A.	113	32	32	20	19	10
Nonrelief	84	18	18	15	10	23

Table 1. Number of families in each color and relief and nonrelief group and distribution of families according to weekly income per food-cost unit in dietary survey in Washington, D. C., June 27-July 23, 1938.

converted to an adjusted per capita basis, using the scale of relative cost of providing food for persons of each sex and different ages developed by the Bureau of Home Economics, Department of Agriculture. In this scale, "one food-cost unit" represents the cost of food for an adult male and other persons are counted as fractional "food-cost units" according to the relative cost of food.[3] Families were classified into five income groups, using a class interval of $1.33 per food-cost unit per week. It was estimated[4] that about $5.33 weekly income per food-cost unit was necessary in Washington to provide for a family at an emergency standard of living. Three in-

[3] For scale of relative food costs, see footnote 5.

[4] Estimated from cost-of-living data for Washington, D. C., given in INTERCITY DIFFERENCES IN COSTS OF LIVING IN MARCH, 1935; 59 CITIES, by Margaret Loomis Stecker. Washington, Works Progress Administration Research Monograph XII, 1937, 216 pp.

come groups below this level and two above have been used in the present study.

The distribution of families according to these five income groups is shown in Table 1. Among white families, only 13 per cent of those in the Public Assistance group and 48 per cent of those with a W.P.A. employee had a weekly income of $5.33 or more per cost unit, but 75 per cent of the nonrelief families had $5.33 or more. Smaller percentages of the Negro families in each relief and nonrelief category had incomes above the emergency level of $5.33 per week per cost unit.

Negro families were larger than the white families, as shown in Table 2, and this accounts for some of the difference in income per cost unit. The income group into which a family was placed was dependent very largely on the size of the family.

Tabulation of Food Data. Total amounts of each food used in the two-day period were obtained for families in each color, type of relief or nonrelief, and income group, and average amounts were computed per equivalent adult unit. The amount per equivalent adult unit for each group represents the per capita consumption

Table 2. Average size of family[1] for groups classified according to color, relief status, and weekly income per food-cost unit in dietary survey in Washington, D. C., June 27-July 23, 1938.

Color and Relief Status	All Incomes	Weekly Income per Cost Unit				
		Under $2.67 I	$2.67-3.99 II	$4.00-5.32 III	$5.33-6.66 IV	$6.67 or More V
White						
Public Assistance	3.9	6.5	4.1	3.1	3.0	2.7
W.P.A.	3.4	4.8	4.7	3.8	2.8	2.4
Nonrelief	3.6	5.9	4.6	3.9	3.9	3.0
Negro						
Public Assistance	4.5	5.8	4.1	2.8	2.3	—
W.P.A.	4.5	6.9	4.6	3.7	2.1	2.5
Nonrelief	4.0	4.6	5.1	3.9	3.8	2.8

[1] Average size of family is average number of persons per household, including related and unrelated persons dependent on money received during time of study, but excluding persons who paid board.

adjusted for differences in energy or calorie requirements of persons of each sex and age.[8] Average amounts of foods reported were multiplied by 3.5 to obtain weekly values for comparison with other studies.

From the total amounts of each food used, approximate quantities of calories, protein, calcium, and iron available were calculated. The estimated requirements for these nutrients by sex and age differ, and the average daily supply per consumption unit was computed by the scale of the Bureau of Home Economics.

Adjustment in the equivalent nutrition units in each family was made for meals not eaten at home by any members and for visitors sharing meals with the family.

Before considering the food consumption of these Washington families, it is of interest to note the sex and age composition of families in the color and relief and nonrelief categories. As shown in Table 3, the Public Assistance Department families, both white and colored, had a definite preponderance of females and an un-

[8] The relative scales of nutritional need by sex and age for calories, protein, calcium, and iron, and the scale of relative food cost published by the Bureau of Home Economics are given below. These are taken from "Nutrition—Final Report of the Mixed Committee of the League of Nations on the Relation of Nutrition to Health, Agriculture and Economic Policy." Geneva, 1937.

Individuals by Age and Sex	Food Cost	Energy Value	Protein	Calcium	Iron
Child under 4 Years	60	40	70	150	40
Boy 4– 6; Girl 4– 7	70	50	80	150	50
Boy 7– 8; Girl 8–10	90	70	100	150	70
Boy 9–10; Girl 11–13	95	80	110	150	80
Boy 11–12; Girl 14–19	100	83	110	150	90
Boy 13–15	110	100	110	130	100
Boy 16–19	112	120	110	130	100
Woman 20–74	95	90	100	130**	100
Man 20–74	100	100*	100	100	100
Woman 75 and Over	90	80*	100*	100*	80*
Man 75 and Over	90	90*	100*	100*	90*

* Not specified in publication; values shown are those used in this study.
** Not used in this study; an allowance of 100 was made for women.

The "nutrition unit" is taken to represent 3,000 calories, 70 grams protein, 68 grams calcium, and 0.015 grams iron. The scale is expressed in percentages, 100 indicating the need for one "nutrition unit."

Sex and Age Group	White Families			Negro		
	P.A.D.	W.P.A.	Non-Relief	P.A.D.	W.P.A.	Non-Relief
Total Persons[1]	395	309	361	503	506	336
Per Cent Males	44.3	48.9	48.8	40.4	47.6	48.2
Per Cent Females	55.7	51.1	51.2	59.6	52.4	51.8
Per Cent Under 10 Years	34.6	23.4	21.6	39.8	28.4	28.9
Per Cent 10-19 Years						
Male	13.7	10.3	11.6	13.7	9.1	6.8
Female	12.6	7.7	9.4	14.9	10.5	9.2
Per Cent 20 Years or Older						
Male	12.2	27.5	26.6	6.4	23.9	23.8
Female	26.9	31.1	30.8	25.2	28.1	31.3

[1] Excludes boarders and visitors for meals, but includes all persons in household considered as an economic unit.

Table 3. Sex and age distribution in families classified by color and relief status in diet survey in Washington, D. C., June 27-July 23, 1938.

usually large percentage of children under ten years of age. This relief class included a large number of families receiving aid for dependent children. The W.P.A. families and nonrelief families were not very different in sex and age composition but, among white families, there were more males than females in the age group 10 to 19 years. Apparently employment of older male children, especially on W.P.A. work, was a factor in keeping these families from requiring other welfare assistance.

QUANTITIES OF VARIOUS FOODS CONSUMED

Average Diet of High-Income Families. As local food habits, food prices, and season affect the use of specific foods, the average amounts of various foods used by families with sufficient income to purchase an adequate food supply may be taken as an index of the diet of choice for low-income families under prevailing market conditions in a specific community. The average diet of families with $6.67 per week per cost unit in Washington during the period June 27 to July 23 is shown in Table 4 and compared with a recommended low cost diet.

The average diet purchased by white families at maintenance income levels was well supplied with foods from each of the food groups required for variety and balance in the diet. The season was a most favorable one for the use of vegetables and fruits, and the amounts reported were considerably above the suggested quantities for an adequate diet at minimum cost. The use of meats, eggs, fats, and sugar also greatly exceeded recommended quantities. As might be expected, very few families used dried fruits or legumes at this season. The consumption of milk and milk-products by each of the high-income groups except the nonrelief white families was much lower than the recommended amount.

Negro families with weekly incomes above $6.67 per cost unit reported larger amounts than white families of fats, lean meats and fish, grain products and sugar; and the consumption of these foods was greatly in excess of recommended quantities. The amounts of

Table 4. Pounds of specific foods or food groups per adult unit (energy) per week used by white and Negro families with weekly incomes of $6.67 or more per cost unit in the dietary survey in Washington, D. C., June 27 to July 23, 1938.

Food Group	Minimum Cost Diet Adequate[1]	White Families		Negro Families	
		Non-Relief	W.P.A.	Non-Relief	W.P.A.
Eggs	.56	0.81	0.84	0.95	0.67
Milk Products	10-12	9.23	7.52	6.21	5.13
Fatty Foods	.96	1.51	1.38	2.28	1.78
Butter	—	0.46	0.36	0.48	0.37
Sugar, Syrup, Jellies	.90	1.49	1.20	1.75	1.66
Lean Meat and Fish	1.16	3.63	3.54	4.66	4.87
Total Grain Products	4.33	3.61	3.74	5.00	5.17
Bread and Pastry	2.00	2.03	2.11	1.11	0.56
Potatoes	3.25	2.77	3.61	3.15	2.79
Dried Legumes, Nuts	.57	0.06	0.29	0.20	0.81
Dried Fruit	.45	0.04	—	—	0.15
Vegetables: Leafy, Green, Yellow	1.94	2.92	2.25	2.84	2.89
Tomatoes and Citrus Fruit	1.15	2.44	2.86	1.47	0.69
Other Vegetables	1.86	1.84	2.30	2.33	0.34
Other Fruits		5.39	1.25	3.23	4.33

[1] Derived from Stiebeling, Hazel K. and Ward, Medora: Diets of Four Levels of Nutritive Content and Cost. U. S. Department of Agriculture, Circular No. 296.

vegetables and fruits used by Negro families was fairly similar to the consumption by white families, but there were less tomatoes and citrus fruits in the Negro diet. The consumption of milk products by Negro families was about half the recommended quantity.

The average diets reported in Washington by white and Negro families of moderate income are characteristic of the food consumption of such families living in the southeastern region of the United States. This is evident from a comparison with the average food consumption by white and Negro families found by the Bureau of Home Economics[6] in surveys made at various periods in 1934-1936. In Figure 1 the average amounts of ten groups of foods used by white and Negro families in the Washington survey, having a *weekly income* of $6.67 or more per cost unit (nonrelief and W.P.A. combined), are compared with average food consumption reported by the white and Negro families in southern cities whose *expenditures for food per week* were $2.67 to $3.32 per food-cost unit.[7] Although there was a greater abundance of fresh vegetables and fruits in the summer diets in Washington, especially in the diets of white families, the composition of the average dietary is remarkably similar in the two studies.

Nutritive Content of Diet of Higher Income Group. The average diet of the white families in the higher income group was found to be adequate in energy value and to supply amounts of protein, calcium, and iron believed to be sufficient to give a good margin for

[6] From mimeographed tables, "Diets of Families of Wage Earners and Low-Salaried Clerical Workers Living in Industrial Communities in Three Regions of the United States, 1934-36." Records collected by the United States Bureau of Labor Statistics and analyzed by the Bureau of Home Economics with assistance from the Works Progress Administration. The white families surveyed in the southern region lived in Birmingham, Mobile, or Memphis; and the Negro families lived either in these cities or in Richmond or New Orleans.

[7] The Bureau of Home Economics classified families according to the amount of money spent for food in one week. Studies of total family budgets by the Bureau of Labor Statistics have shown that families with low incomes spend, on the average, about 40 per cent of their total income for food. The average diet of families with a total weekly income of $6.67 or more per cost unit may be taken as roughly comparable with the average diet of families spending $2.67 to $3.32 per week per cost unit.

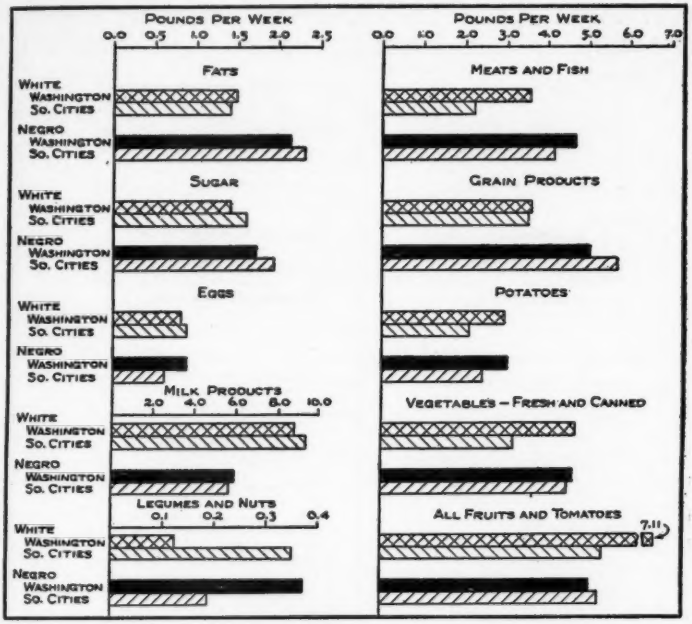


Fig. 1. Pounds per week per adult male (energy unit) of different food groups in summer diets of white and Negro families in Washington with weekly *incomes* of $6.67 or more per cost unit compared with food consumption reported by the Bureau of Home Economics for white and Negro families in various southern cities whose weekly *expenditures for food* were $2.67 to $3.32 per cost unit.

safety. The nutritive content is shown in Table 5. The white families had a larger amount of protein than is thought necessary, and some excess in calories,[8] but the calcium and iron furnished were very close to the safety allowance. This average diet, therefore, was reasonably well balanced and of adequate mineral[9] content, although the foods used did not represent the cheapest and most fre-

[8] An allowance for table waste would bring the caloric value of the foods used very close to the 3,000 calories taken as adequate. Although some waste is inevitable, in the present study the estimates of the housewife no doubt include some understatements of amounts used, and there is no good basis available for judging the amount to be allowed for waste.

[9] No estimate of vitamin content was made, but the vitamin content of the diet of this group would meet usual allowances with the possible exception of B_1.

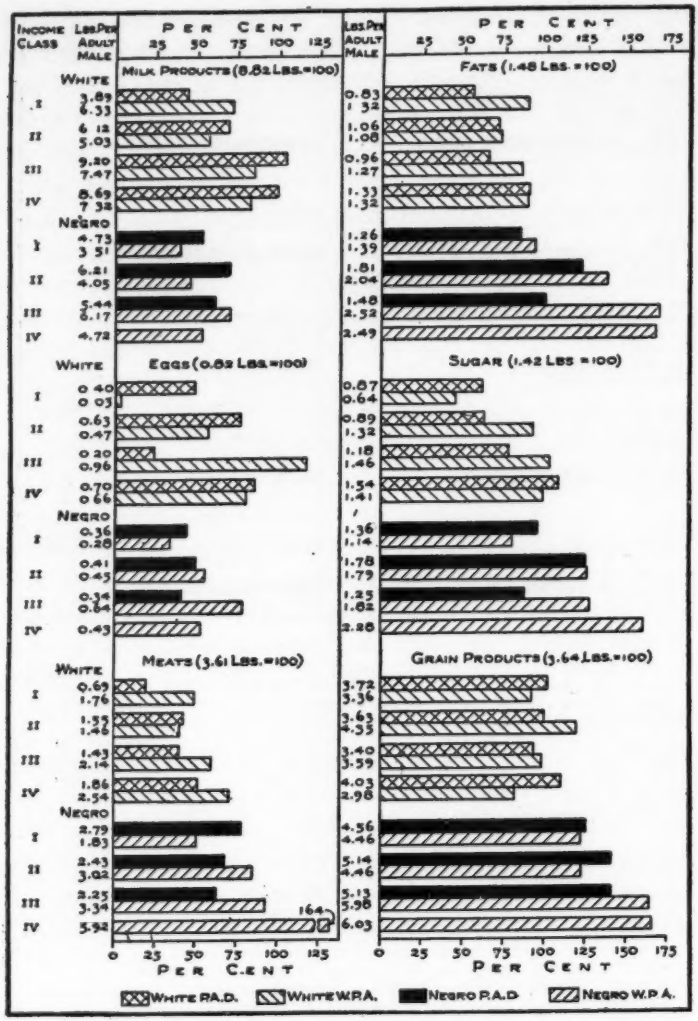
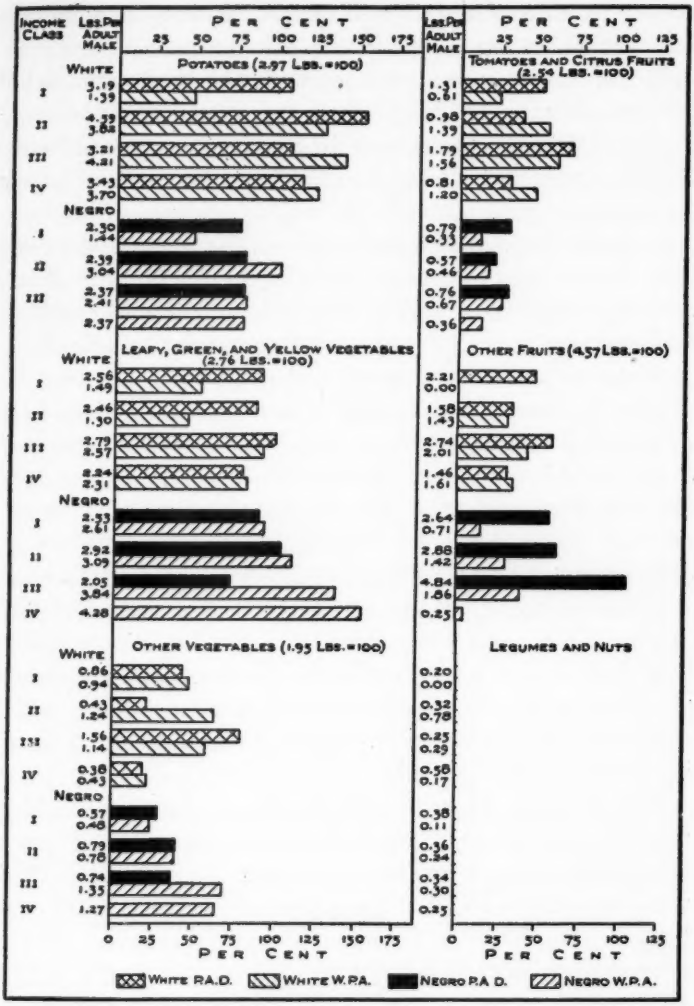


Fig. 2. Ratio of average amounts of various food groups used by white and Negro families at different income levels to amount used by white families with weekly

(Continued on page 19)



incomes of $6.67 or more per cost unit. Pounds of food per week per adult male are also indicated on the chart for each income group, Group I being families with lowest incomes.

quently recommended sources of specific nutrients for a low-cost diet.

The Negro diet, however, was less well balanced than the diet of white families. It provided less than the recommended adequate allowance for calcium, although the amount was above estimated minimum requirements, and it furnished a large excess of protein and calories.

Food Consumption of Relief Families. The amounts of various types of food used by families receiving money from the Public Assistance Department and by families with a W.P.A. employee, are shown in Figure 2. Average pounds consumed by different income groups classified by color are shown on the chart, and the ratio of these averages to the amount used by white families (non-relief and W.P.A. combined) in the highest income group is indicated by the length of the shaded bars. Relative amounts of the different groups of foods which were consumed at various income levels are clearly shown for the white families. Since the average consumption of Negro families at different income levels is shown as the percentage of the amounts used by high-income white families, the relative change in consumption at different income levels is not indicated for Negro families, but the differences in the use of the food groups according to income are clearly shown, and a comparison of consumption by white and Negro families at similar income levels is readily made.

From the data presented in Figure 2, several broad indications may be noted. It is apparent that the consumption of most types of food decreased as income decreased, and this was true for both white and Negro families. The principal exceptions to this relationship were that white families in lower income groups used, in general, more potatoes than the high-income group, and the consumption of potatoes by Negroes did not vary with income; and white families also had approximately the same amount of grain products at each income level. One other exception to the general

reduction in amounts of foods used that is of interest is the lack of decline in the consumption of leafy, green, and yellow vegetables reported by white P.A.D. families as income diminished. These families received string beans, cabbage, and carrots from the Surplus Commodities Corporation[10] during July, and these foods were used by some families in the two days included in the study. The food groups in which the greatest reductions occurred at lowest income levels were lean meats and fish, tomatoes and citrus fruits, and all other fruits.

Differences noted in the diets of white and Negro families in the highest income group persist at each income level. Thus, the Negroes definitely use more fats, sugars, and grain foodstuffs than the whites having similar incomes; and their consumption of meat and especially of fish also was relatively high. In contrast with the higher use of energy supplying foods, the Negro families consumed less tomatoes and citrus fruit, fewer eggs, and drank less milk than whites having equivalent incomes.

Nutritive Value of Relief Diets. The net effect on the energy value and mineral content of the average dietary which results from the reduced consumption of nearly every food group, is shown in Table 5 and Figure 3.

Both the calcium and iron content of the average diet of white families at incomes of $5.33 to $6.66 per week per cost unit for each relief or nonrelief group, dropped below the safety allowance, except the calcium in the diet of the Public Assistance Department group. At each lower income level, the amount of these minerals was further diminished, and calcium available was barely equal to

[10] Commodities distributed during July were: flour, rice, potatoes, butter, dried apples, fresh string beans, carrots, and cabbage. A few other items, such as dried milk and dried beans, appeared on the schedules, and presumably these were carried over from previous months. Families in the P.A.D. group presumably were all eligible for obtaining surplus commodities, but those in the W.P.A. group were eligible only if there were more than four persons in the family. Some surplus commodity was used in the two-day period by 67 per cent of white families and by 73 per cent of Negro families in the P.A.D. group; in the W.P.A. group, 25 per cent of white families and 28 per cent of Negro families reported the use of some surplus commodity.

Nutritive Value and Color and Relief Status	All Incomes	Weekly Income per Cost Unit				
		Under $2.67	$2.67-3.99	$4.00-5.32	$5.33-6.66	$6.67 or More
	Calories—standard allowance 3,000					
White Families						
Public Assistance	2,630	2,260	2,620	2,760	3,220	3,040*
W.P.A.	3,000	2,200	2,960	3,130	2,890	3,280
Nonrelief	3,090	2,230	2,540	2,960	3,120	3,420
Negro Families						
Public Assistance	3,340	2,960	3,640	3,140	4,470*	—
W.P.A.	3,360	2,590	3,520	4,380	4,460	4,120
Nonrelief	3,710	3,130	3,450	4,150	3,930	4,200
	Protein, grams—safety allowance 70 grams[1]					
White Families						
Public Assistance	57	46	59	59	71	67*
W.P.A.	70	53	60	73	69	88
Nonrelief	75	53	58	70	78	83
Negro Families						
Public Assistance	69	65	71	69	101*	—
W.P.A.	71	53	72	86	111	109
Nonrelief	81	71	76	79	77	102
	Calcium, grams—safety allowance .68 grams[1]					
White Families						
Public Assistance	0.44	0.29	0.42	0.55	0.73	0.60*
W.P.A.	0.53	0.45	0.36	0.56	0.59	0.71
Nonrelief	0.62	0.42	0.48	0.58	0.63	0.71
Negro Families						
Public Assistance	0.39	0.33	0.42	0.41	1.14*	—
W.P.A.	0.37	0.28	0.37	0.50	0.60	0.59
Nonrelief	0.40	0.37	0.32	0.37	0.32	0.62
	Iron, milligrams—safety allowance 15 mg.[1]					
White Families						
Public Assistance	10.9	9.4	11.2	11.3	11.6	13.3*
W.P.A.	12.4	8.1	10.7	13.7	12.0	15.0
Nonrelief	13.7	9.2	11.1	12.1	13.0	15.7
Negro Families						
Public Assistance	12.1	11.6	12.8	11.5	15.4*	—
W.P.A.	12.6	9.0	12.8	16.0	17.8	20.7
Nonrelief	14.6	12.7	14.5	14.7	13.3	17.2

* Only three families in the group.

[1] Two-thirds of this amount is estimated to be the minimum requirement.

Table 5. Energy value and mineral content daily per nutrition unit of diets of white and Negro families classified according to relief status and weekly income per cost unit in Washington, D. C., June 27-July 23, 1938.

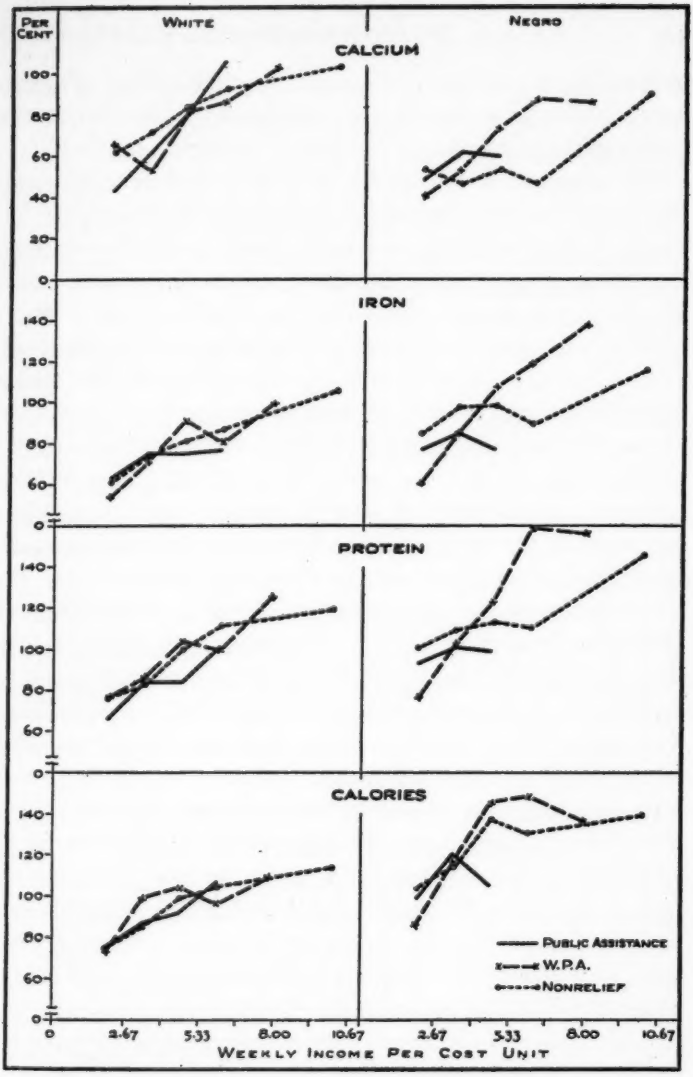


Fig. 3. Per cent of the standard allowances for calories and minerals which was furnished by the average diet of white and Negro families at different income levels in Washington, D. C. See Table 5 for actual amounts and for standard allowances.

or less than the estimated minimum requirement for all groups with less than $4.00, but the iron available was as low only for the groups with less than $2.67.

The energy value and the protein content of the average diet of white families were maintained at levels between adequate and marginal at the lower income levels and neither fell seriously below nutritional requirements except for families with less than $2.67 weekly per cost unit.

Negro families had a diet more than adequately supplied with calories at every income level except the lowest and most groups had approximately an adequate amount of protein even at the lowest income level. The iron content of the Negro diet was intermediate between marginal and safety allowances for groups with low income, except for the W.P.A. group with an income under $2.67 per cost unit; and, at equivalent income levels, the Negroes had a more adequate supply of iron than the white families. On the other hand, the Negro diet was seriously deficient in calcium at every income level except the highest, and families in this group had less than the suggested adequate allowance. This reflects chiefly the very limited use of milk products by Negro families regardless of their income level, but Negroes also had less calcium than white families from fruits and vegetables.

In summary, diets of both white and Negro families were extremely low in calcium and only slightly better in iron. The average values for families with less than $4.00 per week suggest that a very high proportion of the families had diets definitely deficient in one or both of these elements. At higher incomes, the average values were somewhat below adequacy for most groups, and it may be assumed that many families in these groups were obtaining a diet too low in calcium and iron to provide a safe margin for health and growth requirements of children.

It is of interest to note that the limited quantity of food received by families on direct relief from the Surplus Commodities Cor-

poration during the study period did not materially affect the dietary level of these families. At equivalent income levels,[11] families on direct relief reported essentially the same diet as that reported by families with an employed worker.

CALORIES IN DIETS OF INDIVIDUAL FAMILIES

The distribution of families according to the estimated energy value in the food consumed by individual families is shown in Table 6. Since the source of income made no difference in the average values, the distributions are shown only according to color and income.

It is apparent that the caloric value of the diets did not center around any average or modal value. The range in caloric intake was extremely wide[12] and, for the white families, there was a fairly even distribution over most of the range. Among Negro families there was a tendency for families to concentrate above 3,600 calories per day per adult, but below this amount the distribution flattens out and extends down to a very low number of calories, except for the group with highest income.

The percentage of families with a gross deficiency in calories increased sharply as income diminished. Among white families whose weekly income was less than $4.00 per cost unit, 14 per cent had a diet supplying less than 1,600 calories per day per adult unit, and 34 per cent had less than 2,000 calories. About 15 per cent of Negro families at this income level had less than 2,000 calories per day. In the income group $4.00 to $6.67 per week, 16 per cent of

[11] Value of surplus commodities received was not added to money income in classifying families.

[12] The wide range in caloric value of diets purchased by families of similar income is not an unusual finding. Similar variations in calories in the winter diet of white families in North Atlantic Cities has been reported by Stiebeling. *See* Stiebeling, Hazel K.: Nutritive Value of Diets of Families of Wage Earners and Clerical Workers in North Atlantic Cities, 1934-35. *Monthly Labor Review* (July 1936) of the Bureau of Labor Statistics, United States Department of Labor. From analysis of individual family records of food consumption in one week obtained by the inventory method, Stiebeling showed that among 21 families which spent $1.20 to $1.80 weekly for food per cost unit, 9 had less than 2,400 calories daily per energy unit and 5 had 3,300 or more. Since families in the study by Stiebeling were classified by *amount spent for food*, much less variability in the diet would be expected than when families are classified by total income.

Color and Weekly Income per Cost Unit	Total	Calories per Day per Adult Unit							
		Under 1,600	1,600-1,999	2,000-2,399	2,400-2,799	2,800-3,199	3,200-3,599	3,600-4,399	4,400 or More
	Number of families with specified number of calories								
Under $4.00									
White	92	13	18	11	18	7	11	8	6
Negro	194	11	19	16	26	24	18	38	42
$4.00-$6.66									
White	113	6	12	18	15	19	19	19	5
Negro	83	4	3	6	6	4	13	19	28
$6.67 or More									
White	87	3	3	10	11	13	14	19	14
Negro	33	2	0	0	2	2	5	6	16
	Per cent of families with specified number of calories								
Under $4.00									
White	100.0	14.1	19.6	12.0	19.6	7.6	12.0	8.7	6.5
Negro	100.0	5.7	9.8	8.2	13.4	12.4	9.3	19.6	21.6
$4.00-$6.66									
White	100.0	5.3	10.6	15.9	13.3	16.8	16.8	16.8	4.4
Negro	100.0	4.8	3.6	7.2	7.2	4.8	15.7	22.9	33.7
$6.67 or More									
White	100.0	3.5	3.5	11.5	12.6	14.9	16.1	21.8	16.1
Negro	100.0	6.1	0	0	6.1	6.1	15.1	18.2	48.5

Table 6. Distribution of families according to energy value of two-day diet record for white and Negro families classified by weekly incomes in Washington, D. C., June 27-July 23, 1938.

white families and 8 per cent of Negro families had diets furnishing less than 2,000 calories per man per day. Diets as low as these in energy values are certain to be deficient in most nutrients. The acute shortage of food indicated for some families may have been temporary, but, even if these data do not represent the normal or average food level of these specific families, they suggest the prevalence of much undernourishment in the lowest income groups. Whether the same families subsist at such low dietary levels over sufficiently long periods as to produce deficiency diseases must be studied by other methods.

SUMMARY

A rapid survey method of collecting family diet histories by obtaining a meal-by-meal record for a two-day period is described. The ease and speed with which such a record can be obtained and the small memory error involved make the method advantageous for large scale surveys. Satisfactory average values for groups of families are provided and the individual family records afford suggestive evidence on the types of substandard diets and their frequency.

A two-day diet record for 602 families in Washington, D. C., was taken in the period from June 27 to July 23, 1938. The survey included white and Negro families of three types; namely, families receiving funds from the Public Assistance Department, families with a W.P.A. employee, and neighbor families with an employed worker.

Most of the families on Public Assistance had a weekly income of less than $5.33 per cost unit (per capita adjusted for sex-age composition), this amount being the approximate income required to maintain an emergency standard of living in Washington. Nearly one-half of the white families and one-fourth of the Negro families in the W.P.A. group had $5.33 or more per capita.

The average diet of white families with $6.67 or more weekly per capita provided an adequate safety allowance of calcium and iron, and more than the standard allowance of protein and calories. The Negro diet of high-income families furnished an excess of calories, protein, and iron, but less than the safety allowance of calcium because of the very limited use of milk.

The energy value and protein and iron content of the average diet of families in the lower income groups was maintained at levels between adequate and marginal requirements, except that calories and iron were below estimated minimum nutritional requirements in the average diet of white families with less than $2.67 weekly per capita. The calcium content of the average dietaries was less than

minimum requirements for nearly every group of white and Negro families with less than $4.00 weekly per capita and was deficient for some Negro groups at higher income levels.

The calories available in the food supply of individual families showed that a very large percentage of white families reported diets seriously deficient in energy value and many Negro families also had diets very low in energy value in spite of the high caloric value of the average Negro diet.

A STUDY OF PUBLIC HEALTH NURSING SERVICE IN TUBERCULOUS FAMILIES IN THE MULBERRY DISTRICT OF NEW YORK CITY[1]

JEAN DOWNES AND CLARA R. PRICE, R.N.

DURING recent years an increasing amount of interest in the evaluation of the work of the public health nurse has been evident. One of the important contributions to the study of the quality of public health nursing service made by the National Organization for Public Health Nursing was an attempt to formulate an objective method of rating of performance of service.[2] Significant studies of the work of the public health nurse have been made also by the Milbank Memorial Fund[3] and the United States Public Health Service.[4] All of these studies are in essence experiments directed toward evolving standards of measurement of nursing service, or an index of results which express quality of work as well as quantity. Yet quantitative standards alone are at present most widely used as a measure of the service rendered by the public health nurse even though it is generally recognized that quantity alone does not necessarily reveal quality.

A special study of tuberculosis conducted in the Mulberry district of New York City has afforded an unusual opportunity for objective study and evaluation of the nursing service in the tuberculous

[1] From the Mulberry Health Center, the Bureau of Tuberculosis of the New York City Department of Health, and the Milbank Memorial Fund.

[2] Tucker, Katherine and Hilbert, Hortense: SURVEY OF PUBLIC HEALTH NURSING ADMINISTRATION AND PRACTICE, 1934, pp. 192-221.

[3] *See* articles by Randall, Marian G.: The Milbank Memorial Fund *Quarterly Bulletin*, July, 1931, ix, No. 3, pp. 103-118; October, 1932, x, No. 4, pp. 1-15. The Milbank Memorial Fund *Quarterly*, January, 1934, xii, No. 1, pp. 1-12; April, 1935, xiii, No. 2, pp. 1-16; July, 1935, xiii, No. 3, pp. 1-21; April, 1936, xiv, No. 2, pp. 163-172; July, 1937, xv, No. 3, pp. 275-291.

[4] *See* articles by McIver, Pearl; Peterson, Rosalie I.; and Bean, Helen, respectively: *Public Health Reports*, United States Public Health Service, April 5, 1935, 50, pp. 469-480; September 20, 1935, 50, pp. 1293-1308; December 3, 1937, 49, pp. 1783-1793; December 31, 1937, 53, pp. 1923-1931; June 3, 1938, 22, pp. 913-921.

families. The data for a limited period of this special study are presented as another experiment in expressing quality of service in quantitative terms.

The special study of tuberculosis in the Mulberry district of New York City has been carried on for three years by the Mulberry Health Center of the Association for Improving the Condition of the Poor and by the Bureau of Tuberculosis of the New York City Department of Health. The Mulberry Health Center with its staff of seven field nurses under the direction of Miss Clara R. Price, R.N., represents the Department of Health in the field of tuberculosis home visiting, and the nurses are responsible for the public health nursing care of the tuberculous patients and their families in the district. The local tuberculosis clinic of the Department of Health, directed by Dr. A. A. Feller, is responsible for providing clinic and x-ray examination for patients referred by the staff of the Health Center.

The section of the City served by the Mulberry Health Center lies roughly between Broadway and the east side of the Bowery, extending from East Houston Street on the north to the north side of Canal Street. The chief characteristics of the neighborhood have been described in some detail in two previous publications.[5, 6] Briefly stated, the families of the district, mainly of Italian birth or parentage, on the whole have a relatively low economic status and the majority of them are living in a generally unfavorable environment, judged by the degree of crowding and by conditions of housing.

When the special program was started in January, 1935, the following groups of families were selected for intensive service and study: all families in the district in which there was a known active

[5] Downes, Jean and Price, Clara R.: Tuberculosis Control in the Mulberry District of New York City. The Milbank Memorial Fund *Quarterly*, October, 1937, xv, No. 4, pp. 319-347.

[6] Burritt, Bailey B.: Social and Economic Problems in the Control of Tuberculosis. The Milbank Memorial Fund *Quarterly*, July, 1938, xvi, No. 3, pp. 287-293.

or arrested case of adult pulmonary tuberculosis were to be included and the new families in which cases in these categories were discovered were to be added during the period of special study; all families in which a death from tuberculosis had occurred during the period 1928-1934, but in which there were no known active cases January 1, 1935, were to be followed.[7] All families in which there was evidence of primary infection in a child but no known active cases of adult pulmonary tuberculosis were to be carried, and an effort was to be made to locate the source of infection. Families related by blood or marriage to any of the above classes of tuberculous families were to be investigated for case finding to ascertain whether or not there had been spread of tuberculosis from one family to another. In addition, families in which there were individuals judged by the nurses as suspects were to be investigated.

DATA AND METHOD OF THE STUDY

To ascertain the effectiveness of a given procedure, such as public health nursing service, in the control of tuberculosis, it is necessary (1) to define the objective or objectives of the procedure in as precise terms as possible and (2) to test the accomplishment of the objective by comparison with the results of other procedures having the same objective or by comparison with suitable controls. This approaches the experimental or laboratory method of measurement and the application of this method to a complex social activity such as public health nursing service is difficult to achieve. However, it is possible to define the objectives of public health nursing service in tuberculous families.

From the point of view of the nursing administration, the chief objective in tuberculosis control is *service to the tuberculous family as a whole*. This chief objective includes other objectives, as follows:

[7] The families in which a death had occurred during the period 1928-1934, but in which there were no known active cases January 1, 1935, in most instances were families which had been supervised by the Department of Health, and the group is not limited to cases known of only after a death from tuberculosis had occurred.

assistance in securing proper care and treatment for the tuberculous patient, assistance in securing the examination of the family contacts, general health supervision for all members of the family, attention to special problems (health or socio-economic) in the family. From the data of this study it is possible to test the effectiveness of *accomplishment* of only one of these objectives, namely, the examination of the family contacts.* Nevertheless, the extent to which all of these objectives formed a part of the nursing program can be appraised, and such an appraisal provides one index of the value of the work in the Mulberry district.

In addition, volume of nursing service without reference to specific objectives of the service can be used for certain types of appraisal which are of some value from the point of view of nursing administration.

The data consist chiefly of records of the service rendered by seven nurses for a period of seven and one-half months during 1937. A daily time sheet was kept by each nurse upon which the amount of service and the amount of time were recorded for each visit during that day. For each visit, the name of the family which received the service was recorded and each individual in the family who received a service was listed. The type of service rendered to each individual also was entered on the record. The total amount of time spent on the visit was recorded by the nurse and the amount of time spent on each of the various services rendered during the visit was estimated and entered by her. When planning the day's visiting, the nurses were asked to record the main objective of each visit which they expected to make. It is believed that these data covering a period of seven and one-half months may be considered as a representative sample of the public health nursing service in tuberculous families in the Mulberry district during 1937. For certain parts of

* The extent to which the examination of family contacts was secured was discussed in an earlier publication. Downes, Jean and Feller, A. A.: Clinic Service in the Control of Tuberculosis. The Milbank Memorial Fund *Quarterly*, October, 1938, xvi, No. 4, pp. 338-358.

the study, also, data of volume of services for the entire year are used.

APPRAISAL OF VOLUME OF NURSING SERVICE

During 1937 there were 856 families in the Mulberry district which were carried because of the special study of tuberculosis. The nursing service in the 856 families should be considered in relation to the tuberculosis problem in the family. The most striking way to indicate the relative importance of the tuberculosis problem in these families is to show the prevalence of active adult pulmonary tuberculosis during 1937 among the examined individuals in the families grouped according to the index case or the initial reason for going into the family. These data are presented in Table 1. The highest prevalence of active adult pulmonary tuberculosis was noted in the families supervised because of active tuberculosis or because of a death from pulmonary tuberculosis, where the rates were 12.6 and 5.2 per 100, respectively. In these families the rates of prevalence of active disease were from twenty-five to sixty times as high as the lowest rate, 0.2 per 100, observed in the 517 families where the index case was a child with primary infection. Three active cases were present during 1937 among members of the forty-six families selected for supervision because of a case of arrested pulmonary tuberculosis. Two of these were reactivated index cases formerly classed as arrested; the other was a secondary case in the family. The rate of prevalence of active disease among individuals in these families, 1.6 per 100, was similar to the rate, 1.3, noted in families where the index case was a blood relative of a tuberculous individual. In these two groups of families the rates were from six to eight times the lowest rate, 0.2 per 100, observed in the 517 families where the index case was a child with primary infection.[9] It should be pointed out also that the families in the last three groups

[9] Accurate data on prevalence of tuberculosis can be obtained only through examination of all members of the family. It is believed that the prevalence rates shown here and based upon the examined population are indicative of the differences in the amount of tuberculosis present in the various groups of families.

Age Group	Total Population	Total Examined	Diagnosed Cases of Tuberculosis					
			Rate per 100			Number of Cases		
			Active Adult Pulmonary Tuberculosis	Arrested Adult Pulmonary Tuberculosis	Active Nonpulmonary Tuberculosis	Active Adult Pulmonary Tuberculosis	Arrested Adult Pulmonary Tuberculosis	Active Nonpulmonary Tuberculosis
51 families - index case - active pulmonary tuberculosis								
All Ages	236	175	12.6	6.8	1.1	22	12	2
0-9	34	27	0	0	3.7	0	0	1
10-19	54	48	10.4	2.1	0	5	1	0
20+	148	100	17.0	11.0	1.0	17	11	1
47 families - index case - death from pulmonary tuberculosis								
All Ages	217	134	5.2	5.2	0	7	7	0
0-9	17	15	0	0	0	0	0	0
10-19	70	58	3.4	5.2	0	2	3	0
20+	130	61	8.2	6.6	0	5	4	0
46 families - index case - arrested pulmonary tuberculosis								
All Ages	255	192	1.6	20.3	0.5	3	39	1
0-9	35	27	0	0	0	0	0	0
10-19	88	74	0	2.7	1.4	0	2	1
20+	132	91	3.3	40.7	0	3	37	0
517 families - index case - primary infection in a child								
All Ages	3,205	1,813	0.2	0.9	0	4	16	0
0-9	652	508	0	0	0	0	0	0
10-19	1,188	909	0.1	0.2	0	1	2	0
20+	1,365	396	0.8	3.5	0	3	14	0
107 families - index case - blood relative of tuberculous family								
All Ages	481	225	1.3	0.9	0	3	2	0
0-9	110	62	0	0	0	0	0	0
10-19	97	68	1.5	0	0	1	0	0
20+	274	95	2.1	2.1	0	2	2	0
88 families - index case - healed nonpulmonary and suspect tuberculosis								
All Ages	485	246	0.4	1.2	0	1	3	0
0-9	98	63	0	0	0	0	0	0
10-19	138	83	0	0	0	0	0	0
20+	249	100	1.0	3.0	0	1	3	0

Table 1. Prevalence of adult pulmonary tuberculosis and active nonpulmonary tuberculosis among examined individuals in 856 families classified according to the index case (in all groups of families the index case, if living, is included).

shown in the table were carried primarily for case finding. However, the prevalence of active disease affords clear evidence as to

Classification of Families	Number of Families	Months of Service	Money Spent by Mulberry Health Center	Cost per Month of Service per Family	Cost per Family per Year
Total Families-All Classes	856	8,845	$27,803.48	$3.14	$37.68
Index Case-Active Pulmonary Tuberculosis	51	493	2,947.17	5.98	71.76
Index Case-Death from Pulmonary Tuberculosis	47	465	2,335.49	5.02	60.24
Index Case-Arrested Pulmonary Tuberculosis	46	446	1,779.42	3.99	47.88
Index Case-Primary Infection in a Child	517	5,526	14,819.25	2.68	32.16
Index Case-Nonpulmonary Tuberculosis	21	182	444.86	2.44	29.28
Index Case-Blood Relative of Tuberculous Family	107	1,059	3,280.81	3.10	37.20
Index Case-Individual with Recent Attack of Acute Respiratory Disease	67	674	2,196.47	3.26	39.12

Table 2. Cost of service given by Mulberry Health Center to families classified according to the index case in the family—1937.

which groups of families needed the greatest emphasis in the tuberculosis nursing service.

The cost of intensive public health nursing service in tuberculous families in a congested area of a large city has been an important part of the special study of tuberculosis in the Mulberry district. Table 2, which shows the cost to Mulberry Health Center of their service and where it has been concentrated, indicates that service for the various groups of families cost from $29.28 to $71.76 per family per year during 1937.[10] Families in which the problem of control of tuberculosis was centered received the greatest amount of service; namely, families carried because of an active case of

[10] The population base used in the analysis of cost by family groups is expressed in units of time, instead of numbers of families; that is, a month of service for each family is the unit of time. Such a procedure eliminates the bias which would be introduced if individual families carried for various time periods were given equal weight. For example, the nursing visits per month of care per family give a more accurate picture of service than the average number of nursing visits per family, when some families may have been carried two months, three months, six months, or nine months, during the year.

adult pulmonary tuberculosis and those carried because of a death from pulmonary tuberculosis.[11]

A previous study of the volume of service on the basis of cost for the families grouped according to the tuberculosis problem in them indicated that in 1936 the service had been too intensive in families where the problem was not acute and it was recommended that there be a shifting of emphasis in the program of tuberculosis nursing work.[12] By a comparison of the distribution of services among the different groups of families in 1937 with that in 1936, it is possible to see whether or not an effective effort was made to shift the emphasis in the program of nursing service.

Table 3 shows for 1936 and 1937 the percentage difference in the amounts of service given to each group of families compared with those carried because of a death from pulmonary tuberculosis. It can be readily seen that in 1936 all of the groups of families had more intensive service than did families in which the index case was a pulmonary death, these latter families where the need for intensive service, judged by the prevalence of active disease among their population, was relatively great. In 1937, however, only one group of families received more intensive service, namely, families in which the index case was active adult pulmonary tuberculosis. All other groups of families received in 1937 from 20 to 50 per cent less service than did those families in which the index case was a death from pulmonary tuberculosis. This comparison illustrates the importance of a critical appraisal of volume of services.

An indication of the amount of service given by the nurses to the families in the Mulberry district may be revealed also by the fre-

[11] The method of arriving at the amount of money spent on the various groups of families by Mulberry Health Center is as follows: 89 per cent of the money paid out for house, general, clerical, and statistical expenses was allocated to tuberculosis work in the 856 families. The entire expense of supervision and two-thirds of the cost of a nutritionist were allocated to tuberculosis.

Data of nurses' time were tabulated for the different groups of families. Money spent was allocated to families on the basis of the amount of time and service given to those families during the year.

[12] See footnote 5.

Classification of Families	Amount the Annual Cost per Family in Each Class Exceeded or Fell Below the Cost for Families in which Index Case was a Pulmonary TB Death		Per Cent Above or Below	
	1936	1937	1936	1937
Index Case-Death from Pulmonary Tuberculosis				
Index Case-Active Pulmonary Tuberculosis	$+26.76	$+11.52	+72.9	+19.1
Index Case-Arrested Pulmonary Tuberculosis	+11.88	−12.36	+32.4	−20.5
Index Case-Primary Infection in a Child	+12.60	−28.08	+34.3	−46.6
Index Case-Nonpulmonary Tuberculosis	+ 9.72	−30.96	+26.5	−51.4
Index Case-Blood Relative of Tuberculous Family	+ 1.32	−23.04	+ 3.6	−38.2
Index Case-Individuals with Recent Attack of Acute Respiratory Disease	+ 6.84	−21.12	+18.6	−35.0

Table 3. Comparison of annual cost per family in the different groups with cost for families in which the index case was a pulmonary tuberculosis death.

quency of nursing visits. In 1937 the nurses made 7,260 visits contrasted with 7,405 visits in 1936. Less than 10 per cent of the visits in each year (8.7 in 1937 and 9.2 per cent in 1936) was classed as ineffective or "not-at-home" visits. Table 4 shows the number of nursing visits per family per year for 1937 and for 1936 based on months of service and number of visits in each year for the different groups of families classified according to the index case. Families in the various groups in 1937 received from 8 to 17 visits per year of service contrasted with from 10 to 16 visits per year of service during 1936. The average for all classes of families was 13 visits per year in 1936 compared with 10 visits per year in 1937. The change in emphasis in the program of nursing supervision again is clearly evident in this presentation of nursing visits. In 1937 from 2 to 4 fewer visits per family per year were made in families where there was need for decreasing the amount of supervision.

Classification of Families	Number of Months of Service	Number of Visits Made by Nurses[1]	Number of Nursing Visits per Month of Service per Family	Number of Visits per Family per Year
Total Families 1937	8,843	6,636	0.8	9.6
1936	6,289	6,727	1.1	13.2
Index Case-Active Pulmonary Tuberculosis				
1937	493	676	1.4	16.8
1936	391	516	1.3	15.6
Index Case-Death from Pulmonary Tuberculosis				
1937	465	530	1.1	13.2
1936	407	372	0.9	10.8
Index Case-Arrested Pulmonary Tuberculosis				
1937	446	434	1.0	12.0
1936	523	594	1.1	13.2
Index Case-Primary Infection in a Child				
1937	5,526	3,594	0.7	8.4
1936	3,686	4,072	1.1	13.2
Index Case-Nonpulmonary Tuberculosis				
1937	182	118	0.6	7.2
1936	161	169	1.0	12.0
Index Case-Blood Relative of Tuberculous Family				
1937	1,059	777	0.7	8.4
1936	778	662	0.9	10.8
Index Case-Individual with Recent Attack of Acute Respiratory Disease				
1937	627	513	0.8	9.6
1936	343	342	1.0	12.0

[1] Visits include home visits, office visits, and visits on behalf of patients; not-at-home visits are excluded.

Table 4. Number of visits per family made by the nurses in the Mulberry district during 1936 and 1937. (Families classified according to the index cases in the family.)

EXTENT TO WHICH THE OBJECTIVES OF PUBLIC HEALTH NURSING SERVICE IN TUBERCULOSIS WERE A PART OF THE NURSING PROGRAM

Since volume of nursing service alone cannot be considered as an entirely satisfactory measure of the quality of the work being done, data from special records of the services rendered by the nurses

during 1937 have been utilized in appraising the extent to which the main objectives of the nursing service in tuberculosis have formed a part of the nursing program. As was stated before, it is assumed that the family will be considered as a unit and that all members of the family will receive some form of public health nursing service. The examination of the family contacts, the general health supervision of all members of the tuberculous family, and attention to special health and socio-economic problems in the family should be included in the nursing service.

The extent to which all members of the family received some form of public health nursing service is shown in Table 5. The families are classified according to the type of index case in the

Table 5. Population in 856 families classified according to type of index case and the per cent of individuals receiving no nursing service during 1937.

Age Group	51 Families Index Case-Active Pulmonary Tuberculosis	47 Families Index Case-Death from Pulmonary Tuberculosis	46 Families Index Case-Arrested Pulmonary Tuberculosis	517 Families Index Case-Primary Infection in a Child	21 Families Index Case-Nonpulmonary Tuberculosis	107 Families Index Case-Blood Relative of Tuberculous Individual	67 Families Index Case-Ind. with Recent Attack of Acute Respiratory Disease
Total Population	236	217	255	3,205	148	481	337
0-19 Years	88	87	123	1,840	78	207	158
20 Years and Over	148	130	132	1,365	70	274	179
Individual Given No Service During 1937 Total	12	20	35	578	18	107	71
0-19 Years	6	8	16	278	9	37	26
20 Years and Over	6	12	19	300	9	70	45
Per Cent Given No Service During 1937 Total	5.1	9.2	13.7	18.0	12.2	22.2	21.1
0-19 Years	6.8	9.2	13.0	15.1	11.5	17.9	16.5
20 Years and Over	4.1	9.2	14.4	22.0	12.9	25.5	25.1

family and the total population for each group of families and the number given no service are shown by broad age groups. From 5 to 14 per cent of the individuals in the families presenting the more important tuberculosis problems received no service from the nurse during 1937; namely, families in which the index case was active adult pulmonary tuberculosis, or was a death from pulmonary tuberculosis, or was an arrested case of adult pulmonary tuberculosis. It should be pointed out, however, that in the families where the need for service to all members was greatest, those with active tuberculosis, only 5 per cent of the total members of these families received no service. In the groups of families where case finding was a primary objective, from 18 to 22 per cent of the members of the family received no service. These data indicate that the nurses in the Mulberry district considered the family as a unit and that emphasis was placed upon those families most in need of their services.

Nursing Services in Relation to Objective of Visit. It is of considerable interest to examine the objectives of the visits made to the various groups of families.[23] For each group of families the percentage distribution of visits according to the main objective is shown in Table 6. In families where the index case was active adult pulmonary tuberculosis the main purpose of the nursing visit was either to give general health teaching, or to obtain the social and health history of the family or to urge a clinic examination for one or more members of the family; the per cent of the total visits with these objectives were 29.5, 22.8, and 14.9, respectively. Eight per cent of the visits were made for purposes of rendering some special tuberculosis service. The remaining visits, excluding those classed as "miscellaneous objectives," had as their chief purpose the rendering of some special service, such as advice concerning prenatal or postpartum care, to urge dental care or to arrange country care, to

[23] When planning the day's visiting, the nurses were asked to record the main objective of each visit which they expected to make.

Main Objective of Home Visits	51 Families Index Case-Active Pulmonary Tuberculosis	47 Families Index Case-Death from Pulmonary Tuberculosis	46 Families Index Case-Arrested Pulmonary Tuberculosis	517 Families Index Case-Primary Infection in a Child	21 Families Index Case-Nonpulmonary Tuberculosis	107 Families Index Case-Blood Relative of Tuberculous Individual	67 Families Index Case-Ind. with Recent Attack of Acute Respiratory Disease
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
General Health Instruction	29.5	31.9	28.8	24.4	31.4	26.2	29.3
To Obtain Social and Health History	22.8	19.2	25.4	15.7	25.7	17.8	13.5
To Secure Clinic Examination	14.9	18.4	10.7	16.5	20.0	17.2	16.3
For Special Tuberculosis Service	8.3	13.5	8.5	4.7	0.0	6.3	12.0
Prenatal and Postpartum Service	1.0	0.8	0.6	5.3	0.0	7.8	0.5
Service Concerning Social Problems	2.6	2.6	2.2	1.4	2.8	1.2	5.8
To Urge Dental Care	0.7	0.0	0.0	1.6	0.0	0.9	1.4
To Arrange Country Care	2.0	0.0	0.6	3.3	0.0	1.9	2.4
Because of Special Nutrition Problem	0.3	0.0	0.6	1.9	0.0	0.3	0.0
To Investigate Reported Illness	1.6	2.6	1.7	3.4	5.7	3.1	3.8
Visit Requested by Family	1.6	0.8	4.5	3.7	2.9	5.3	1.9
Miscellaneous Objectives	14.7	10.2	16.4	18.1	11.5	12.0	13.1

Table 6. Distribution of main objectives of nursing home visits in 856 families classified according to type of index case in the family. (May 15-December 31, 1937.)

give attention to a special nutrition problem or to a social problem, to investigate reported illness or to make a visit requested by the family. The proportion of visits in these classes varied from less than one per cent to 2.6 per cent.

In the other groups of families the distribution of the visits according to objectives was in each instance generally similar to that noted for families where the index case was active pulmonary

tuberculosis. The conclusion may be drawn, therefore, that a relatively uniform program of nursing service was rendered to all of the families carried by the Health Center even though the tuberculosis problem was not the same in all and service was more intensive in some families than in others.

Since a uniform program of nursing service, judged by the objective of the visits, prevailed in all of the groups of families studied, it seems proper to combine the 856 families into one group and to examine the services rendered on the visits classified according to the chief objective of the visit. These data are shown in Table 7. When general health instruction was the main objective of the visit, the services given by the nurse were mainly general health instruction (34 per cent) and urging a clinic examination (35 per cent). Other services, including references for a special clinic examination (other than for tuberculosis) or medical care, discussion of clinical or medical findings with the patient, teaching precautions against tuberculosis, advice concerning hospital care, advice concerning special nutrition problems, advice concerning financial and social problems, arranging for dental care and for country care, advice concerning prenatal or postpartum care, ranged from less than one per cent to 5 per cent of the total services rendered.

In general there was a relationship between the objective of the visit and the service rendered on that visit. For example, when the chief objective of the visit was to secure a clinic examination of one or more members of the family, 62 per cent of the services rendered by the nurse was classed as "urging a clinic examination;" when the chief objective of the visit was advice concerning prenatal or postpartum service, 15.5 per cent of the services fell into that class and 29 per cent was classed as referrals to a special clinic for prenatal or postpartum examination. Securing a clinic examination for tuberculosis was the dominant type of service rendered regardless of the objective of the visit. However, no matter what the objective of the visit was, a variety of services was rendered. This

Classification of Services	Main Objectives of Visits					
	General Health Instruction	Obtain Social and Health History	To Secure Clinic Examination	For Special Tuberculosis Service	Prenatal and Postpartum Service	Service Concerning Social Problem
	Per Cent					
Total Services to Indiv.	100.0	100.0	100.0	100.0	100.0	100.0
Refer for Clinic Exam. for Tuberculosis	35.1	46.9	61.6	30.5	12.3	30.0
Refer for Special Clinic Exam. or Med. Care	5.2	7.1	6.6	4.4	28.7	10.7
Discussed Clinic or Med. Findings with Patient	4.6	4.3	3.9	19.1	5.2	4.9
General Health Instruction	34.2	17.1	14.1	16.6	13.5	21.4
Teaching Precautions Against Tuberculosis	1.4	0.7	1.5	7.5	4.6	1.0
Advise and Arrange Hospital Care	0.5	0.5	0.4	2.3	0.3	0
Advise Concerning Special Nutrition Problem	3.8	3.3	2.5	8.2	4.9	1.0
Discussed Case with Physician	0	0.1	0	0.2	0	0
Advise re. Financial and Social Problems	5.8	5.8	3.5	2.6	2.3	25.2
Arrange for Dental Care	3.4	3.6	1.5	1.6	6.3	1.0
Arrange for Country Care	3.2	1.8	0.6	1.2	5.3	1.9
Advise re. Prenatal and Postpartum Care	0.3	0.5	0.2	0	15.5	0
Health and Social History	2.3	7.5	2.6	1.9	1.1	1.9
Miscellaneous Services	0.2	0.8	1.0	3.9	0	1.0

Table 7. Distribution of nursing services classified according to main objective of nursing visit (856 families). (May 15-December 31, 1937.)

fact may be interpreted as an indication that the nurse gave attention to the special family problems which she noted at the time of the visit.

Nursing Services in Relation to Time Spent and to Age. It is of considerable interest to examine the nursing services rendered to individuals in the different groups of families and their distribution related to the time spent. Table 8 shows these data for the

Classification of Services to Individuals and Time Spent	51 Families Index Case-Active Pulmonary Tuberculosis	47 Families Index Case-Death from Pulmonary Tuberculosis	46 Families Index Case-Arrested Pulmonary Tuberculosis	517 Families Index Case-Primary Infection in a Child	21 Families Index Case-Nonpulmonary Tuberculosis	107 Families Index Case-Blood Relative of Tuberculous Individual	67 Families Index Case-Ind. with Recent Attack of Acute Respiratory Disease
Total Services to Individuals	901	784	661	5,244	161	1,021	634
Total Time Spent (Hours)	171.5	150.3	103.0	734.1	22.4	168.2	111.3
	Percentage Distribution						
Refer for Clinic Exam. (TB)	31.9	40.7	40.7	39.7	38.5	40.3	31.4
Time Spent	23.7	28.9	32.0	30.8	28.7	30.8	26.3
Refer for Special Clinic Exam. or Medical Care	3.7	3.4	8.9	10.8	14.3	9.3	10.6
Time Spent	2.9	3.5	7.6	11.7	13.7	8.7	9.6
Discussed Clinic or Medical Findings With Patient	11.2	8.8	4.7	4.8	3.7	7.0	6.4
Time Spent	12.2	9.7	5.2	6.0	4.9	8.2	7.0
General Health Instruction	25.1	25.2	23.0	17.7	21.1	18.3	24.4
Time Spent	25.7	29.9	26.3	20.7	31.0	20.5	30.4
Teaching Precautions Against Tuberculosis	3.4	4.2	2.0	0.9	1.2	2.4	1.3
Time Spent	4.9	9.7	3.0	1.3	0.4	3.4	1.1
Advise and Arrange Hospital Care	1.6	1.7	0.4	0.4	0.0	0.5	0.8
Time Spent	2.3	3.7	0.4	0.9	0.0	0.6	1.6
Advise Concerning Special Nutrition Problem	3.6	3.3	3.2	3.9	5.6	4.1	3.6
Time Spent	3.8	2.8	3.1	3.8	3.5	3.3	3.4
Discussed Case with Physician	0.4	0.0	0.0	0.1	0.0	0.0	0.2
Time Spent	1.4	0.0	0.0	0.2	0.0	0.0	0.4
Advise re. Financial and Social Problems	5.0	4.7	4.3	5.3	8.7	4.2	6.3
Time Spent	4.7	4.5	6.0	6.4	11.0	4.7	6.2
Arrange for Dental Care	3.7	1.4	4.2	5.9	3.1	3.0	3.2
Time Spent	1.8	1.0	3.4	5.1	2.6	2.8	2.3
Arrange for Country Care	2.8	1.1	1.8	4.2	1.2	2.1	3.5
Time Spent	2.3	0.8	1.7	3.8	0.8	1.6	2.8
Advise re. Prenatal and Postpartum Care	0.6	0.0	0.2	1.4	1.2	2.9	0.8
Time Spent	0.9	0.0	0.2	3.8	2.2	5.6	2.1
Health and Social History	5.0	4.6	5.9	3.5	0.6	3.6	6.3
Time Spent	11.6	4.9	10.5	3.5	0.4	3.8	5.7
Miscellaneous Services	2.0	0.9	0.7	1.3	0.8	2.3	1.2
Time Spent	1.8	0.6	0.6	2.1	0.8	6.0	1.1

Table 8. Distribution of nursing services to individuals and estimated time spent on services in 856 families classified according to the index case in the family. (May 15-December 31, 1937.)

families classified according to the index case or the initial reason for visiting the family. From 55 to 65 per cent of the services in all of the groups of families were classed as either general health instruction or referrals for tuberculosis clinic examinations; from 50 to 60 per cent of the total visiting time was estimated as spent in rendering these particular services. Discussion of clinic or medical findings with the patient formed from 4 to 11 per cent of the nursing services. From 4 to 10 per cent of the services in the different groups of families were referrals to a special clinic or for special medical care.[14]

That other special problems in the family were recognized by the nurses is evident by the fact that services falling in the following categories were rendered to individuals in the various groups of families: advice and arrangements for hospital care, advice concerning a special nutrition problem,[15] financial and social problems,[16] arrangements for dental care and for country care, advice concerning prenatal and postpartum care. There are no criteria established to indicate the expected frequency of special problems in a group of families which should be given attention by the nurse nor are there criteria to indicate the amount of time the nurse should devote to rendering service or assistance to the family in solving special problems. However, it is clearly evident from the data shown in Table 8 that special problems in the family were noted by the nurse and it was estimated that from 13 to 24 per cent of the time spent on visits among families in the different groups was spent in giving services concerning such problems.

A question concerning the nursing services rendered to individuals in the various groups of families which may justly be asked is:

[14] "Special clinics" include infant clinics, prenatal and maternity clinics, orthopedic clinic, cardiac clinic, venereal disease clinic, etc.

[15] General instructions regarding the importance of proper diet are included as a part of "general health instruction." This category includes only special nutrition problems.

[16] Social problems noted by the nurses included problems of employment or unemployment, the need for vocational guidance, behavior problems, poor housing conditions, and delinquency.

Were the services concentrated upon any particular age group? Table 9 shows for each group of families the distribution of the services according to the age of the individual served and the percentage distribution of the population of the families. For the most part members of the families of various ages received the services of the nurse. This is indicated by the fact that the age distribution of the services in the different groups of families follows the age dis-

Table 9. Distribution of nursing services according to age compared with the age distribution of the population in 856 families classified according to the index case in the family. (May 15-December 31, 1937.)

Classification of Families	All Ages	Age Groups				
		0-4	5-9	10-19	20-29	30 and Over
	per cent					
Total Families-All Classes						
Total Nursing Services	100.0	7.7	13.7	31.3	14.0	33.3
Distribution of Population	100.0	6.2	13.2	33.5	16.0	31.1
Index Case-Death from Pulmonary Tuberculosis						
Distribution of Services	100.0	2.8	5.7	30.5	25.4	35.6
Distribution of Population	100.0	1.4	6.4	32.3	26.3	33.6
Index Case-Active Pulmonary Tuberculosis						
Distribution of Services	100.0	3.2	8.5	23.4	20.8	44.1
Distribution of Population	100.0	5.1	9.3	22.9	24.2	38.5
Index Case-Arrested Pulmonary Tuberculosis						
Distribution of Services	100.0	7.1	8.2	30.4	17.4	36.9
Distribution of Population	100.0	3.9	9.8	34.5	19.6	32.2
Index Case-Primary Infection in a Child						
Distribution of Services	100.0	7.8	17.1	36.3	7.4	31.4
Distribution of Population	100.0	5.8	14.6	37.1	12.1	30.4
Index Case-Nonpulmonary Tuberculosis						
Distribution of Services	100.0	6.6	15.6	26.9	16.2	34.7
Distribution of Population	100.0	6.1	14.2	32.4	20.3	27.0
Index Case-Blood Relative of Tuberculous Family						
Distribution of Services	100.0	16.7	12.1	15.3	31.6	24.3
Distribution of Population	100.0	11.8	11.0	20.2	27.8	29.2
Index Case-Individual with Recent Attack of Acute Respiratory Disease						
Distribution of Services	100.0	6.0	10.6	28.5	13.6	41.3
Distribution of Population	100.0	8.3	11.9	26.7	18.7	34.4

tribution of the population quite closely. In certain groups of families there was some tendency to concentrate services upon persons in certain age groups. For example, in families where the index case was a blood relative of a tuberculous family, 16.7 per cent of the services was given to individuals in the age group 0-4 and 11.8 per cent of the total population of these families consisted of children at those ages. On the other hand, in families where the index case was active adult pulmonary tuberculosis, a relatively high proportion of the total services rendered to individuals was given to those 30 years of age and over (44.1 per cent) while individuals at those ages formed 38.5 per cent of the total population. The important fact brought out by Table 9, however, is that the distribution of the services by age in all groups of families so nearly approximated the age distribution of the population of these families.

The recording of all nursing services given to the various families carried by the Mulberry Health Center makes it possible to express these services in terms of a rate. Table 10 shows for the different groups of families classified according to the index case the service

Table 10. Nursing service rate in families classified according to the index case in the family. (May 15-December 31, 1937.)

Classification of Families	Nursing Service Rate per Family per Month of Care	Months of Care	Number of Nursing Services to Individuals and to Family as a Whole
Index Case-Active Adult Pulmonary Tuberculosis	3.4	330.5	1,136
Index Case-Death from Pulmonary Tuberculosis	3.0	326.5	982
Index Case-Arrested Pulmonary Tuberculosis	2.7	312.0	831
Index Case-Primary Infection in a Child	1.8	3,686.0	6,460
Index Case-Nonpulmonary Tuberculosis	1.6	129.5	205
Index Case-Blood Relative of Tuberculous Family	1.7	758.0	1,273
Index Case-Individual with Recent Attack of Acute Respiratory Disease	1.6	506.5	803

rate per family per month of care.[17] It is clearly evident that families in which the index case was active adult pulmonary tuberculosis and those in which the index case was a death from pulmonary tuberculosis received the greatest number of services. These families received 3.4 and 3.0 services per family per month of care, respectively. Families in the other groups received from 20 to more than 50 per cent less services per month of care than did the two groups discussed above.[18]

CONCLUSIONS

In this study an analysis of volume of nursing service has been made in order to illustrate that volume of work without reference to quality can be made to serve a useful purpose for the administrator. Both amount of service on a cost basis and frequency of visits in families grouped according to the tuberculosis problem in them indicated that in 1937 an effective effort had been made to concentrate the nursing service upon families where the need was greatest.

The analysis of the nursing services rendered to the families indicated that the main objectives of the public health nursing program in tuberculosis were a part of the nursing program and were put into effect in the Mulberry district. There was evidence that the family was considered as a unit. In those families where the need for service was greatest, practically all members of the family received some service and the services rendered were not concentrated upon a particular age group. In the visits made by the nurses the greatest emphasis was placed upon securing a tuberculosis clinic examination and upon general health supervision of the family.

[17] The population base used for obtaining a service rate is expressed in units of time, instead of numbers of families; that is, a month of service or care for each family is the unit of time.

[18] It is believed that the difference in these service rates would have been even greater had it been possible to adjust the rates for differences as to size of family and as to age distribution of the population of the various family groups. For example, in the group of families where the index case was a child with primary infection the average number of individuals per family was 6.2 compared with an average of 4.6 individuals per family in the group where the index case was active adult pulmonary tuberculosis.

There was evidence, however, that in visits to the family the nurse noted and gave attention to special health problems and socio-economic problems in the family.

In conclusion it should be stated that the purpose of the special tuberculosis study in the Mulberry district has been to evolve a program for better control of the disease in a congested area of a large city. Nursing service forms an important part of the program for control and a critical evaluation of this service is essential in order to maintain an efficient and balanced program.

VOLUNTARY AND INVOLUNTARY ASPECTS OF CHILDLESSNESS

CLYDE V. KISER[1]

THE Book of Genesis documents the existence of barren women in early Biblical times. Despite the age-old character of the problem, we know little about the incidence of actual sterility today. There are some data regarding proportions childless among marriages of completed fertility, but such figures leave unanswered the question concerning the extent to which such childlessness is voluntary and the extent to which it represents physical inability to bear a child. In view of the researches of Reynolds and Macomber[2] and others, it must be recognized at the outset that sterility is a relative term. There is not in all cases a clear line of demarcation between voluntary and involuntary childlessness, and there is a small but constant passage of childless women from the former into the latter category. Despite this, few will deny the meaningful nature of voluntary and involuntary childlessness among families of completed fertility, and the dearth of knowledge of the relative importance of these factors is often lamented by students of medical problems, students of population, and by social scientists in general.

Two investigations bearing directly upon this question appear to have yielded diametrically opposite results. On the one hand, an analysis presented by Lorimer and Osborn[3] has given suggestive evidence that from two-thirds to three-fourths of the 60 childless

[1] From the Milbank Memorial Fund. The author wishes to express his indebtedness to the National Committee on Maternal Health for its active assistance in collecting data for this study. He is particularly grateful to Raymond Squier, M.D., of that organization. A somewhat briefer version of this paper was read at the meetings of the American Philosophical Society held in Philadelphia, November 18-19, 1938, and is to be published in the proceedings of that meeting.

[2] Reynolds, E. and Macomber, D.: FERTILITY AND STERILITY IN HUMAN MARRIAGES. Philadelphia, W. B. Saunders Co., 1924, p. 158 ff.

[3] Lorimer, F. and Osborn, F.: DYNAMICS OF POPULATION. New York, The Macmillan Company, 1934, pp. 257-258.

women of completed fertility included in the Davis[4] series may be described as involuntarily childless. In contrast are the findings reported by Popenoe[5] who "asked more than 100 adult students at the . . . University of Southern California to list all the cases of permanent childlessness that they knew among their closest friends and relatives, selecting only such marriages as they felt sure would at no time in the future produce children, and only those couples whom they knew so intimately that they felt no doubt as to the motivation of childlessness." Of 862 histories of couples contributed, two-thirds were listed as voluntarily childless. Women of superior social status predominated in this group as well as in that studied by Lorimer and Osborn. Popenoe's sample was considerably larger but appeared to be unduly weighted by women who were pursuing a career. In regard to this situation, Popenoe stated: "This classification is large because so many of my students are teachers, social workers, and the like, and report the cases of their own friends in the professions." The authors of both studies are cautious in the evaluation of their results and emphasize the need for further investigation along this line.

An opportunity to assay the problem in New York City has been provided through the cooperation of the National Committee on Maternal Health. It should be emphasized, however, that this study was mainly experimental from the outset, and that the final usable sample was small, was confined to New York City, and was not otherwise free from limitations. On the other hand, the data possess certain advantages over those collected in the two investigations previously mentioned.

NATURE OF DATA FOR THE PRESENT STUDY

The present study was prompted by the availability of family records from a health survey in which the Milbank Memorial Fund

[4] Davis, Katherine B.: FACTORS IN THE SEX-LIFE OF TWENTY-TWO HUNDRED WOMEN. New York, Harper and Bros., 1929.

[5] Popenoe, Paul: Motivation of Childless Marriages. *The Journal of Heredity*, December, 1936, xvii, No. 12, pp. 469-472.

participated during the fall and winter of 1935-1936. That sample covered 48,000 households in New York City and is believed to be fairly representative, for it purported to include every thirty-sixth domicile listed in the Real Property Inventory's file of occupied houses and apartments in New York City. In that survey a census of persons in the household was the starting point for the present supplementary study of childlessness. It was not possible to identify couples who had never borne a child but it was possible to recognize heads of households and their wives who reported no children in residence. Such couples were chosen for further investigation if they were white, if the wife was under fifty years of age, and if the couple had been married ten years or more (as determined by length of time household had been established). These restrictions served to eliminate elderly couples whose children had left home, and young childless couples who were likely to have children in the future; and they automatically ruled out the possibility of including women who were forty years of age or older at marriage. The names, addresses, and descriptive data concerning socio-economic status were copied for 2,250 couples meeting the above requirements and residing in the four main boroughs of the city. These cases are designated in Table 1 as "original transcripts."

Two methods of study were utilized—the mailed questionnaire and the interview. The plan adopted was to solicit required data from the total group by a mailed questionnaire and later to conduct

Table 1. Distribution by borough of original transcripts, clients receiving questionnaire form and clients returning form by mail.

	Four Boroughs	Brooklyn	Bronx	Manhattan	Queens
Original Transcripts	2,250	668	449	657	476
No Contact	273	78	54	109	32
Clients Receiving Form	1,977	590	395	548	444
Clients Returning Form	159	43	37	49	30
Per Cent Replies	8.0	7.3	9.4	8.9	6.8

personal visits among a random group of women who had not replied by mail.

The questionnaire adopted provided for entries concerning age, years married, whether or not the wife had ever borne a child and, if not, whether she had ever been pregnant. The women who had never experienced a pregnancy were asked to check one of three stated possibilities with respect to the extent of contraceptive practice since marriage. Provisions were also made for indicating whether the failure to have a child had been a disappointment and whether the childless women had ever gone to a doctor to learn why they could not have a child. The recipients were not required to sign their names but a system of identification was devised whereby it was possible to match the returned questionnaires with the descriptive data on the original transcripts and hence to test the socio-economic representativeness of the women who replied by mail.

As shown in Table 1, of the 2,250 women represented in the original transcripts, 1,977 presumably received the questionnaires by mail. The remaining 273[6] were not reached because they had moved without leaving a forwarding address. Of the 1,977 reached by mail, only 159 (or 8 per cent) filled in and returned the questionnaire. Furthermore, since the group of women who sent replies by mail was found to be unduly weighted by individuals of superior socio-economic status, the necessity of another approach was clearly indicated.

As shown in Table 2, a sample of 617 women was drawn at random for the follow-up investigation by personal interview. Two carefully chosen trained nurses[7] were employed to do this field

[6] These include the instances in which no delivery was attempted by virtue of previous clearance of addresses for Brooklyn, Bronx, and Manhattan prospects through the two central post offices serving those boroughs, and also include the unsuccessful attempted deliveries represented by the returned, unopened envelopes marked "not living at this address." The questionnaires were sent out during the summer of 1937, between one and two years after the original survey.

[7] The writer wishes to express his indebtedness to Miss Jean Aldrich, R.N., and to Miss Maude Lyle, R.N., for their competent work.

	Four Boroughs	Brooklyn	Bronx	Manhattan	Queens
Clients Receiving Form	1,977	590	395	548	444
Number in Random Sample	617	173	117	194	133
Per Cent in Random Sample	31.2	29.3	29.6	35.4	30.0

Table 2. Number of women drawn at random for follow-up study, by borough.

work during the fall and early winter of 1937-1938.

Upon completion of the nurses' visits we had from the 617 women in the random sample a total of 459 usable schedules, 405 of which were supplied by nurses and 54 of which were mailed replies. As indicated in Table 3, the total figure represents 74 per cent of the random sample for the four boroughs combined. No schedules

Table 3. Number of returns from women in the random sample follow-up and reasons for failures to secure returns.

Analysis of Returns and Non-Returns	Four Boroughs	Brooklyn	Bronx	Manhattan	Queens
	NUMBER OF WOMEN				
Total in Random Sample	617	173	117	194	133
Returns Secured	459	149	100	130	80
By Mail	*54*	*16*	*14*	*14*	*10*
From Nurses' Visits	*405*	*133*	*86*	*116*	*70*
Returns Not Secured					
Client Had Moved	71	12	11	26	22
Not Found at Home[1]	40	1	—	18	21
Refused	44	11	6	18	9
Deceased	3	—	—	2	1
	PER CENT				
Total in Random Sample	100.0	100.0	100.0	100.0	100.1
Returns Secured	74.4	86.1	85.5	67.0	60.2
Client Had Moved	11.5	6.9	9.4	13.4	16.5
Not Found at Home	6.5	.6	—	9.3	15.8
Refused	7.1	6.4	5.1	9.3	6.8
Deceased	.5	—	—	1.0	.8

[1] Not found at home but living at address.

were secured for the remaining 26 per cent for reasons indicated in the table. Table 3 also shows that the field work was not uniformly successful in the four boroughs, the percentage of returns extending from 60 per cent in Queens[8] to 86 per cent in Brooklyn.

REPRESENTATIVENESS OF THE RETURNS

Since the nurses did not succeed in procuring all required returns, questions arise concerning the type of bias involved as compared with that observed for the mailed replies. The original transcripts (first column in Tables 4 and 5) provide a norm with which the mailed replies and the random sample (second and third columns respectively) may be compared. It is evident from Table 4 that the mailed replies and the interviewed cases were representative in regard to nativity of the wife. Both types of returns were also fairly satisfactory with respect to age of wife and age of wife at marriage. In so far as socio-economic status is concerned, the women who granted interviews were more representative than were those who replied by mail. (*See* Table 5.) The bias that did exist, however, was in a direction opposite to that observed among women who replied by mail. In other words, the nurses failed to secure the expected quota of schedules from women in the upper classes and consequently their returns were weighted somewhat by women in the lower strata.

By virtue of the above type of counter-bias, the combination of all returns secured by mail and through nurses' visits, a total of 564, affords a sample closely resembling the original universe in so far as descriptive and socio-economic attributes are concerned. (Com-

[8] It will be noted that in Queens a relatively high proportion of women were designated as "not found." This proportion would doubtless have been lowered somewhat had it been possible to devote as much time to revisits as was possible in the remaining boroughs where five or six recalls were often made (including some evening and Sunday work). The nurses' visits, however, were terminated when both resigned to take permanent positions elsewhere. Preliminary analysis of the type presented in Figures 1-4 indicated that the combination of the nurses' records with the replies sent by mail yielded a group closely similar to the original universe in so far as socio-economic status is concerned; so it was not deemed necessary to hire a new person for purposes of reducing the number of women designated as "not found" in Queens.

pare first and last columns, Tables 4 and 5). The similarity in the composition of the two groups, with respect to age of wife and age of wife at marriage, is apparent from virtually identical lengths of the solid and shaded bars in Figure 1. Likewise, Figure 2 presents the comparative distributions with respect to family income and monthly rental; Figure 3 with respect to occupation of the husband, and Figure 4 with respect to educational attainment of the husband and wife.

Table 4. Percentage distribution by nativity, age, and age at marriage for specified groupings of women in the survey.

	Total Original Transcripts	Total Mailed Replies	Returns in Random Sample	Total Returns
Number in Samples	2,250	159	459	564
Percentage Distribution By				
Nativity of Wife—Total	100.0	100.0	100.0	100.0
Native	57.8	56.6	55.6	55.1
Foreign	42.2	43.4	44.4	44.9
Age of Wife—Total	100.0	100.0	100.0	100.0
25-29	2.0	3.1	1.3	1.6
30-34	11.6	16.4	8.7	10.5
35-39	24.5	25.2	22.7	23.2
40-44	28.6	26.4	32.0	30.1
45-49	33.3	28.9	35.3	34.6
Age of Wife at Marriage—Total	100.0	99.9	99.9	100.0
Under 20	20.2	18.2	20.7	20.6
20-24	39.2	44.0	36.3	38.6
25-29	26.6	28.3	29.8	28.5
30-34	10.0	7.5	8.5	8.2
35-39	4.0	1.9	4.6	4.1
Base—Number of Cases Attribute Known				
Nativity of Wife	2,250	159	459	564
Age of Wife	2,250	159	459	564
Age of Wife at Marriage	1,252*	159	410	515

* For cases represented in the original transcripts but not in the returns, it was necessary to rely altogether upon the entry "years household established". This was virtually equivalent to "years married" but the enumerators often exercised their privilege of simply recording "10+" if the household had been established 10 years or more. Such cases could not be used in the above analysis of age at marriage.

	Total Original Transcripts	Total Mailed Replies	Returns in Random Sample	Total Returns
Number in Samples	2,250	159	459	564
Percentage Distribution By				
Family Income—Total	100.1	100.0	99.9	100.0
$3,000 and Over	13.0	18.8	10.6	11.5
2,000-2,999	17.1	24.8	20.6	21.8
1,000-1,999	43.8	37.6	40.7	40.4
Under 1,000	26.2	18.8	28.0	26.3
Rent per Month—Total	100.1	99.9	99.9	100.1
$75 and Over	9.0	14.3	7.5	8.3
50-74.99	16.5	12.0	14.8	14.6
30-49.99	48.2	54.1	48.0	49.6
Under 30	26.4	19.5	29.6	27.6
Occupation of Head—Total	100.0	100.0	100.0	100.0
Professional	10.6	21.4	9.8	11.7
Business	39.6	42.8	38.0	38.4
Skilled	39.0	28.3	40.0	38.5
Unskilled	10.8	7.5	12.2	11.4
Education of Head—Total	100.1	100.0	100.1	100.0
Entered College	16.1	29.3	13.6	16.6
Entered High School	26.9	21.7	26.0	25.3
Entered 7th-8th Grade	44.9	42.0	47.6	46.0
Under 7th Grade	12.2	7.0	12.9	12.1
Education of Wife—Total	99.9	100.0	100.0	100.0
Entered College	8.2	15.1	8.5	9.0
Entered High School	31.1	34.6	27.7	30.1
Entered 7th-8th Grade	47.7	40.9	49.0	47.2
Under 7th Grade	12.9	9.4	14.8	13.7
Base—Number of Cases Attribute Known				
Family Income	2,061	149	432	532
Renters (Known Rental)	1,813	133	358	446
Occupation of Head	2,246	159	458	563
Education of Head	2,217	157	450	554
Education of Wife	2,246	159	459	564

Table 5. Percentage distribution of women by family income, rental, occupation of head, and educational attainment of heads and wives for specified groupings of women in the survey.

It should be emphasized that the above tests for representative-

ness refer only to certain descriptive attributes and afford no guarantee of representativeness in so far as voluntary and involuntary aspects of childlessness are concerned. In this connection we can only say that the postulation of representativeness in the latter respect would be based upon poor ground indeed had the sample differed substantially from the original universe in regard to socio-economic status.

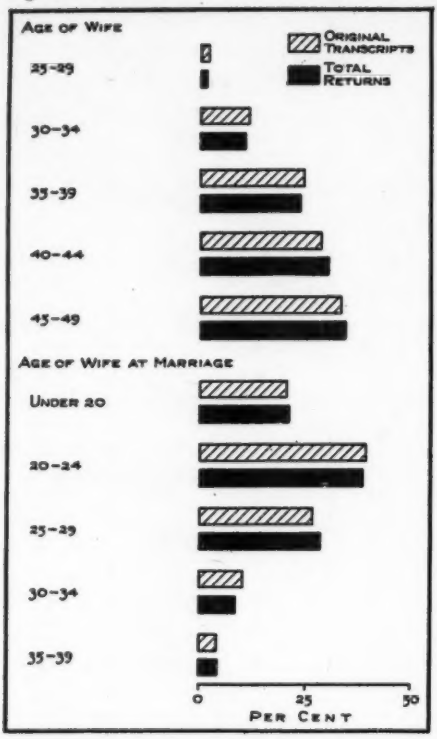


Fig. 1. Percentage distribution by age and age at marriage: wives submitting returns for study of childlessness compared with all included in the original transcripts.

Among the 564 women for whom records were secured there were 411 who reported that they had never borne a child. (*See* Table 6.) These childless women, in turn, were distributed as follows: 291 reported that they had never been pregnant; 90[a] reported a previous pregnancy although they had never borne a child, and 30 gave no report concerning previous

[a] The questionnaires did not require specification of type of pregnancy wastage. This information, however, was given more or less specifically by a substantial number of women, especially among those interviewed by nurses. The 90 women were distributed as follows: 17 had one or more stillbirths but no live births; 5 reported tubal pregnancies; 32 specified one or more spontaneous abortions; 7 specified induced abortions; 9 reported "abortions" but did not specify type; and 20 gave no information aside from the report that they had never borne a child but had been pregnant.

pregnancy.[10] Percentage distributions, based upon reported histories of previous pregnancies, indicate that a little more than three-fourths of the childless women considered here had never conceived, the range by borough extending from 71 per cent in Queens to 82 per cent in Brooklyn.

If the present sample is a true one, it may be estimated that a little over 9 per cent childlessness existed in the four boroughs among all white couples (heads and wives) in which the wives were under 50 years of age and had been married 10 years or more. Analyzed by nativity, the estimates were 11 per cent among native wives and 7 per cent among foreign wives of the above description. These estimates are closely in line with actual findings from family survey data from the Bushwick section of Brooklyn[11]

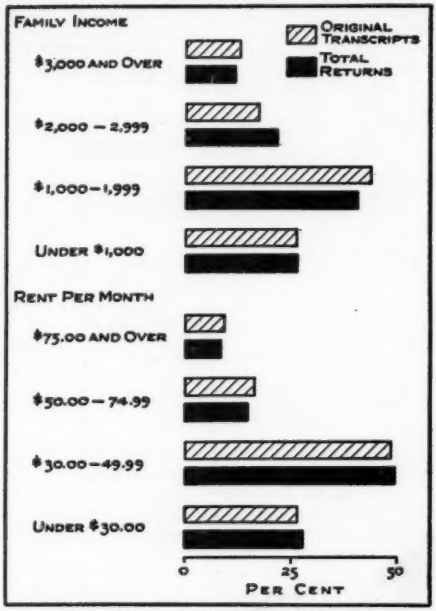


Fig. 2. Percentage distribution by total family income and by monthly rental: wives submitting returns for study of childlessness compared with all included in the original transcripts.

[10] In addition to failure or refusal of the clients to divulge information other than the fact of childlessness, there are included in these 30 a few instances in which the nurses failed to contact the women but learned from other sources (mothers, sisters) that the women in question had never borne a child. Information from such secondary sources was not solicited, or accepted for data other than those concerning previous childbirth.

[11] From the Bushwick survey, conducted in 1933, the rate of childlessness and age at marriage distributions could be analyzed as below for:

(Continued on page 60)

and restricted to couples comparable with regard to maximum age of wife and minimum duration of marriage. In Bushwick, childlessness was observed among 12 per cent of the native wives and among 8 per cent of the foreign wives who were under 50 and had been married 10 years or more. On the other hand, the Bushwick data, as well as other studies,[13] indicate that the above estimates are lower than actual rates derived by the more ordinary procedure of relating childlessness to wives of com-

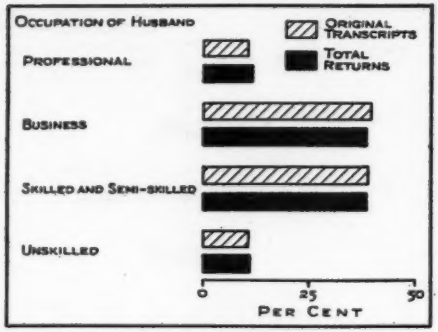


Fig. 3. Percentage distribution by occupational class of the husband: wives submitting returns for study of childlessness compared with all included in the original transcripts.

Group 1. Wives under 50 years of age who had been married 10 years or more (comparable to the New York City data).

Group 2. Wives 40 years of age or older, regardless of duration of marriage (all remarriages and separations occurring before the wife became 45 were excluded).

Age At Marriage	Native Whites				Foreign Whites			
	Per Cent Childless		Age at Marriage Per Cent Distribution		Per Cent Childless		Age at Marriage Per Cent Distribution	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
Total	12	18	100	100	8	10	99	99
Under 20	7	8	31	22	5	3	34	23
20–24	11	11	46	43	8	8	45	45
25–29	20	21	17	21	11	11	16	20
30–34	30	38	5	8	*	18	4	8
35–39	*	53	1	4	*	*	***	2
40 and Over	**	*	**	2	**	*	**	1
Number in Samples	1,127	1,426	1,127	1,426	445	750	445	749

* Base too small.
** Ruled out.
*** Less than 1 per cent.

[13] Notestein has found from analyses of samples from the 1910 Census returns that

(Continued on page 61)

pleted fertility regardless of duration of marriage. Judging from the Bushwick material, the total rate of childlessness among women under 50 and married 10 years or more is lower than a rate based upon wives 40 years of age and over, only as a result of differences in the age at marriage distributions. Within specific bridal ages no significant differences were found in rates of childlessness for the two types of populations. The dual restrictions with regard to maximum age of wife and minimum duration of marriage result in a subnormal representation of relatively late ages at marriage. This situation, however, has its advantages for studies bearing on the relative importance of sterility and voluntary childlessness. Even aside from the fact that marriages after 40 were eliminated, it would appear that the childless couples for this study were drawn from a universe[13] in which the

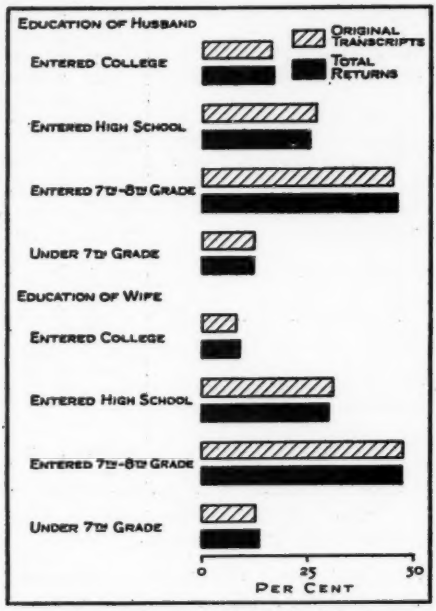


Fig. 4. Percentage distribution by education of the husband and of the wife: wives submitting returns for study of childlessness compared with all included in the original transcripts.

around 16 per cent childlessness existed among native white urban couples of "completed fertility" (wives 40-49). *See* Notestein, F. W.: The Differential Rate of Increase Among the Social Classes of the American Population. *Social Forces*, October, 1933, xii, No. 1, p. 21.

[13] This "universe" included 17,971 white wives (of heads) in the four boroughs who reported in the original health survey that they were under 50 years of age and that the household had been established 10 years or more.

History of Previous Births and Pregnancies	Four Boroughs	Brooklyn	Bronx	Manhattan	Queens
	Number of women				
Total	564	176	123	165	100
Has Borne a Child	153	56	31	43	23
Childless	411	120	92	122	77
Never Pregnant	291	88	67	84	52
Has Been Pregnant	90	19	20	30	21
Pregnancy History Unknown	30	13	5	8	4
	Per cent				
Total Childless	100.0	99.9	99.9	100.1	100.0
Never Pregnant	70.8	73.3	72.8	68.9	67.5
Has Been Pregnant	21.9	15.8	21.7	24.6	27.3
Pregnancy History Unknown	7.3	10.8	5.4	6.6	5.2
	Per cent				
Childless—Pregnancy History Known	100.0	100.0	100.0	100.0	100.0
Never Pregnant	76.4	82.2	77.0	73.7	71.2
Has Been Pregnant	23.6	17.8	23.0	26.3	28.8

Table 6. History of previous births and pregnancies among women submitting returns for the survey, by borough.

wives had a somewhat better than average opportunity to have children in so far as age at marriage is concerned.

Analysis Restricted to Never-Pregnant Women

Attention is now directed to the replies submitted by the never-pregnant women, for these women alone were requested to answer the questions concerning contraception. The data are consistent in their implications that absence of conception among couples married ten years or more is in large part an involuntary situation.[14] In this respect the findings are in agreement with those of Lorimer

[14] In considering the implications of a high proportion of infecundity among the childless couples in this sample, it should be emphasized that we are here concerned with the experience of the *mated couples*, not with potential fecundity of the individual wife or husband.

and Osborn, not with those of Popenoe. As indicated in Table 7 and Figure 5, over three-fourths of the never-pregnant women reported that neither they nor their husbands had ever done anything since marriage to prevent conception; about 9 per cent stated that only temporary or occasional practice of contraception had been employed, and approximately 14 per cent reported regular and continuous practice. Furthermore, two-thirds of the never-pregnant women reported that they were disappointed in their childless condition and 57 per cent declared that they had, in the past, consulted a physician to ascertain why they could not have a child.[15]

Table 7. Contraceptive practice since marriage, attitude toward childless condition, and solicitation of medical advice among women reporting that they were never pregnant.

Classification	Number Women	Per Cent[1]
Contraceptive Practice Since Marriage		
TOTAL	291	100.0
Never Practiced	217	77.8
At Times—Not Always	24	8.6
Regularly and Always	38	13.6
Unknown	12	
Attitude Toward Childlessness		
TOTAL	291	100.0
Disappointed	187	66.8
Not Disappointed	93	33.2
Unknown	11	
Solicitation of Medical Advice		
TOTAL	291	100.0
Has Sought	157	57.3
Has Not Sought	117	42.7
Unknown	17	

[1] Percentages based upon number of women supplying reports for respective classifications.

[15] The major importance of involuntary factors is likewise implied when all childless women in the sample (not simply the never-pregnant women) are considered. As previously stated, the questionnaire requested only from never-pregnant women replies concerning practice of contraception since marriage. The childless women who had been pregnant, however, submitted these returns and those concerning attitudes and solicitation of medical advice in sufficiently large proportions to warrant suggestive presentation. The results for the total 411 childless women, stated in ranges according to the disposition of "unknowns," suggested that from two-thirds to three-fourths had never practiced contraception, from 60 to 70 per cent were "disappointed" with their condition and from 50 to 60 per cent had consulted a physician to find out why they could not have a child. Even if all the childless women submitting returns, but supplying no report concerning use of contraception, are assumed to have been *regular* practicers, there would be an outside maximum of only 26 per cent of all childless women in the sample who could be regarded as having regularly and constantly practiced contraception since marriage.

An attempted two-fold division of the childless women, based upon detailed analysis of the returns, indicated that from 70 to 80 per cent of the native white childless women and

(Continued on page 64)

At first it may appear that the proportions of never-pregnant women reporting no contraceptive practice is incredibly high. Pearl[38] found that only 47 per cent of 3,420 white maternity cases delivered in hospitals in New York City reported *no* previous contraceptive practice. Nevertheless, the present findings are not inconsistent with those of Pearl. All of the women in Pearl's sample had been pregnant at least once, whereas our present consideration is restricted to women who were never pregnant after ten years or more of married life. This, together with the fact that Pearl's cited analysis is confined to women free from any form of gynecologic disease, constitutes a cardinal difference between the two sets of data. It is well known that contraceptive practice increases with order of pregnancy. Thus, although only 40 per cent of the

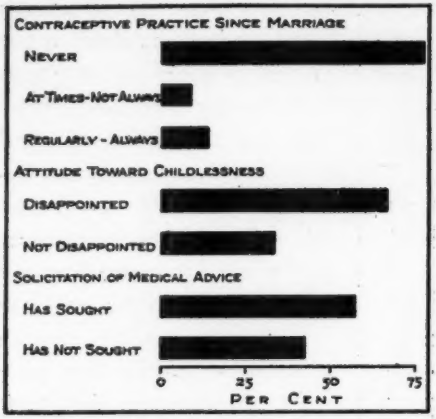


Fig. 5. Distribution of never-pregnant women submitting returns for study of childlessness, according to practice of contraception since marriage, expression of disappointment over childless condition, and by previous solicitation of medical advice.

80 to 85 per cent of the foreign white childless women in the sample could be regarded as involuntarily without offspring. For suggestive purposes, these ratios may be applied to the estimated rates of childlessness in the more general population, presented on page 59. Among white couples (heads and wives in the four boroughs) in which the wife was native, under 50 years of age, and had been married 10 years or more, around 8 or 9 per cent were thus estimated to have been involuntarily childless, leaving 2 or 3 per cent voluntarily childless women. Among foreign wives of similar description with regard to age and duration of marriage, it was similarly estimated that 5 or 6 per cent were involuntarily childless and 1 or 2 per cent had deliberately avoided parenthood altogether. These estimates, of course, are necessarily crude and have been presented mainly for the purpose of setting the central findings of this study in a broader perspective.

[38] Pearl, Raymond: Fertility and Contraception in New York and Chicago. *The Journal of the American Medical Association*, April 24, 1937, cviii, pp. 1385-1390.

multiparous women in Pearl's sample reported *no* contraceptive practice since marriage, 61 per cent of the primiparous women in his sample gave such report. It therefore may not appear unreasonable that 78 per cent of the never-pregnant women in the present sample should report themselves as never having practiced contraception. This is especially true when it is considered that the present sample does not exclude couples who have never practiced contraception due to their knowledge that such efforts were unnecessary.

The volunteered comments on the schedules confirm the indication of involuntary childlessness among women who have never conceived. Among the 291 who were never pregnant there were 158 who stated in specific or in general terms the nature of a pertinent operation or affliction, *or* stated that they had been advised *by a physician* that there was "no apparent reason" for failure to conceive. It is not without interest that the above number of women who volunteered such information constituted 54 per cent of the total number of women who had never conceived. If the number includes lay opinions and, therefore, imagined ailments, it also excludes an unknown number declining to comment on real physical disorders accounting for sterility.[27]

Lack of space prevents more than brief mention of the variations in extent of contraceptive practice within the group of never-pregnant women. The small size of the sample precluded dependable results, but in general it appeared from Table 8 that the proportion reporting *no* contraceptive practice was lower among the native whites than among those of foreign birth, lower among women in the younger age groups than among those in the older, and lower among women of most educated groups than among

[27] The following grouping of the 158 women according to reported pathology is presented merely as a suggestion of their collective, not individual, importance: history of tubal infection, 9; uterine operations performed or advised, 26; ovarian pathology, 8; severe abdominal and/or pelvic infections, 5; infantile uterus, 12; uterine displacement, 15; endocrine condition, 5; husband sterile, 10; operations designed to facilitate pregnancy, advised or performed, 24; "being treated," "natural causes," "general debility," "not properly mated," etc., 23; *physician advised* there was "no apparent reason" for failure to have a child, 21.

Classification by Specified Attribute	Contraception Since Marriage		Disappointment		Solicitation of Medical Advice	
	Base	Per Cent Never Practiced ± σ	Base	Per Cent Disappointed ± σ	Base	Per Cent Has Sought ± σ
Nativity of Wife						
Native	152	74 ± 4	153	62 ± 4	148	55 ± 4
Foreign	127	82 ± 3	127	72 ± 4	126	60 ± 4
Age of Wife						
Under 35	33	67 ± 8	32	72 ± 8	29	66 ± 9
35-39	78	72 ± 5	78	71 ± 5	77	64 ± 5
40-44	86	79 ± 4	88	65 ± 5	87	59 ± 5
45-49	82	87 ± 4	82	63 ± 5	81	47 ± 6
Family Income						
$3,000 and Over	33	76 ± 8	34	71 ± 8	33	64 ± 8
2,000-2,999	65	71 ± 6	65	58 ± 6	65	49 ± 6
1,000-1,999	101	77 ± 4	66	65 ± 5	95	56 ± 5
Under $1,000	69	88 ± 4	68	76 ± 5	69	65 ± 6
Occupation of Head						
Professional	37	65 ± 8	38	68 ± 8	39	44 ± 8
Business	98	80 ± 4	99	63 ± 5	97	55 ± 5
Skilled	115	81 ± 4	114	71 ± 4	110	65 ± 5
Unskilled	28	79 ± 8	28	64 ± 9	27	59 ± 9
Education of Head						
College	52	62 ± 7	53	64 ± 7	50	50 ± 7
High School	60	72 ± 6	60	63 ± 6	59	54 ± 6
7th-8th Grades	125	83 ± 3	126	68 ± 4	124	60 ± 4
Under 7th Grade	34	91 ± 5	33	73 ± 8	33	70 ± 8
Education of Wife						
College	26	58 ± 10	27	63 ± 9	27	56 ± 10
High School	92	74 ± 5	91	63 ± 5	86	57 ± 5
7th-8th Grades	122	81 ± 4	122	69 ± 4	121	57 ± 5
Under 7th Grade	39	90 ± 5	40	73 ± 7	40	60 ± 8

Table 8. Proportions of never-pregnant women reporting no contraceptive practice since marriage, disappointment in failure to have a child, and past solicitation of medical advice according to nativity, age, and socio-economic status.

their opposites. The group differences in proportions expressing disappointment and in proportions claiming past solicitation of medical advice were smaller and of less consistent nature. Of central importance, however, was the fact that in all strata the absence of conception after ten years or more of married life appeared to be

largely an involuntary situation. Moreover, a surprisingly high number of women had sought medical advice to ascertain why they had failed to conceive.

Questions may arise concerning the possible importance of late age at marriage among the never-pregnant women reporting no contraceptive practice. By virtue of the original restrictions, of course, all of these women were under 40 at the time of marriage. The actual distribution shows that 13 per cent were under 20, 57 per cent were under 25, and 87 per cent were under 30.[18] For purposes of a control, similar data are available for a group of Bushwick (Brooklyn) white women from an altogether different survey.[19] The 1,572 cases used are comparable with respect to maximum age of wife and minimum duration of marriage but were unselected with respect to fertility or contraceptive practice. Among the latter group 32 per cent were under 20 years of age when they married, 78 per cent were under 25, and 94 per cent were under 30. In general, it would appear that late age at marriage was a factor but was not of primary importance[20] in the childless condition of the never-pregnant women reporting no contraceptive practice or among the total group of never-pregnant women in the present sample.

It should be emphasized to the reader that any study of factors underlying childlessness among women who can be described as permanently childless must perforce be largely concerned with contraceptive practices reaching back into the past. By virtue of the restriction of the present sample to women under 50 who have been married 10 years or more, the latest possible period considered was

[18] Virtually the same distribution was found for the total group of never-pregnant women.

[19] A population survey conducted in 1933 among 5,135 white families in the Bushwick section of Brooklyn. *See* Kiser, C. V.: Trends in Annual Birth Rates among Married Women in Selected Areas According to Nativity, Age, and Social Class. The Milbank Memorial Fund *Quarterly*, January, 1937, xv, No. 1, pp. 48-74.

[20] This, however, is partly inherent in the previously discussed restriction of the original universe to wives under 50 with a minimum duration of marriage of 10 years.

from about 1927 to the present. For the oldest women in the sample the reported histories of contraception since marriage could be influenced by use or non-use of such practices as early as 1905. The ranges of time considered, therefore, began from 1905 to 1927 and ended with the date of the survey. In view of the recent decline in the birth rate it is possible that there has been some increase in the extent of voluntary childlessness.

CONCLUSION

For a really definitive study we need for a random group of childless couples detailed social and medical records, including complete histories of contraceptive practice and any pregnancy wastage,[21] studies of attitudes and, most of all, medical data similar to those now existing only for the selected group of childless couples who consult specialists. Until such data become available, investigations somewhat similar to the present are needed in other areas. Pending further studies the writer's tentative conclusion is that, however prevalent may be the practice of contraception for purposes of postponing and spacing pregnancies, such practices cannot be held responsible for any major share of existing permanent childlessness. One recipient of the questionnaire unwittingly touched upon the central indications of this study when she wrote: "I firmly believe that most childless women are physically unable to have children and to [*sic*] poor to go through treatments. For life without children is a very dreary dissatisfyed [*sic*] life, judging by myself and friends."

[21] Abortions and stillbirths.

BIRTH CONTROL IN A MIDWESTERN CITY

A STUDY OF THE CLINICS OF THE CINCINNATI COMMITTEE ON MATERNAL HEALTH

REGINE K. STIX, M.D.[1]

I. CONTRACEPTION AND FERTILITY BEFORE CLINIC ATTENDANCE

INTRODUCTION

TWO important trends in birth rates have been carefully studied within the past decade. They are (1) the rapid decline in the birth rates of the population as a whole, and (2) the differentials in the birth rates of various social and occupational groups. Urban families have lower birth rates than rural families, and among urban families white-collar workers are reproducing at a lower rate than manual laborers.[2]

Within the past five years a number of studies have demonstrated clearly the importance of contraception as a factor in both trends. Several studies have been published which show the prevalence and effectiveness of contraception in selected groups of urban families,[3] but it is necessary to have more information about differently

[1] From the Milbank Memorial Fund.

The author wishes to acknowledge with appreciation the work of Florence G. Lindquist, R.N., who conducted the interviews, and the cooperation of the Medical Director, the Executive Secretary and the Executive Board and staff of the Cincinnati Committee on Maternal Health.

[2] Griffin, H. C. and Perrott, G. St.J.: Urban Differential Fertility During the Depression. The Milbank Memorial Fund *Quarterly*, January, 1937, xv, No. 1, pp. 75-89.

Kiser, Clyde V.: Variations in Birth Rates According to Occupational Status, Family Income, and Educational Attainment. The Milbank Memorial Fund *Quarterly*, January, 1938, xvi, No. 1, pp. 39-56.

Notestein, Frank W.: The Relation of Social Status to the Fertility of Native-Born Married Women in the United States. PROBLEMS OF POPULATION, G.H. L.F. Pitt-Rivers, *ed.* London, George Allen & Unwin, Ltd., 1932.

Notestein, Frank W.: Differential Fertility in the East North Central States. The Milbank Memorial Fund *Quarterly*, January, 1938, xvi, No. 2, pp. 173-191.

Sydenstricker, Edgar and Notestein, Frank W.: Differential Fertility According to Social Class. *Journal of the American Statistical Association*, March, 1930, pp. 10-32.

[3] Beebe, Gilbert and Gamble, Clarence: The Effect of Contraception Upon Human Fertility. *Human Biology*, September, 1938, x, No. 3, pp. 372-387.

(Continued on page 70)

selected groups, both urban and rural, before it is possible to estimate the extent to which contraception is practiced in broad regions of the United States. Studies of patients of birth control clinics offer one approach to the problem, but even these have been limited to clinic patients in a few eastern cities, and the results cannot be assumed to be typical of those which might be obtained from similarly selected groups of women living in less cosmopolitan sections of the country.

For these reasons the Milbank Memorial Fund initiated a study of the patients of the clinics of the Cincinnati Committee on Maternal Health, in the spring of 1935. Its object, like that of the study made previously of the Birth Control Clinical Research Bureau in New York,[4] was to assess the prevalence and effectiveness of the contraception in use before the women attended the clinic, and the acceptability and effectiveness of clinically prescribed contraceptives.[5]

THE CLINICS

The Cincinnati Committee on Maternal Health opened its first clinic in November, 1929 and has since opened several additional clinics. They have been operated under the sponsorship of the local Academy of Medicine as referral clinics for women who could not

Dewees, Lovett and Beebe, Gilbert: Contraception in Private Practice. *Journal of the American Medical Association*, April 9, 1938, cx, pp. 1169-1172.

Pearl, Raymond: Contraception and Fertility in 2,000 Women. *Human Biology*, September, 1932, iv, No. 3, pp. 363-407; Contraception and Fertility in 4,945 Married Women. *Human Biology*, May, 1934, vi, No. 2, pp. 355-401; Fertility and Contraception in Urban Whites and Negroes. *Science*, May 22, 1936, lxxxiii, No. 2160; Third Progress Report on a Study of Family Limitation. The Milbank Memorial Fund *Quarterly*, July, 1936, xiv, No. 3, pp. 258-284; Fertility and Contraception in New York and Chicago. *Journal of the American Medical Association*, April 24, 1937, cviii, pp. 1385-1390; Specific Fertility and Contraceptive Rates in New York City and Chicago. *American Journal of Hygiene*, May, 1937, xxv, No. 3, pp. 507-519.

Stix, Regine K. and Notestein, Frank W.: Effectiveness of Birth Control. The Milbank Memorial Fund *Quarterly* (I.), January, 1934, xii, No. 1, pp. 57-68; (II.), April, 1935, xiii, No. 2, pp. 162-178.

[4] *Ibid:* Stix, Regine K. and Notestein, Frank W.

[5] The present report will be limited to a discussion of the preclinic prevalence and effectiveness of the contraception used by patients of the Cincinnati clinics. Comparisons of the findings with those reported in other studies will be published later.

afford the services of private physicians and who needed contraceptive advice because of illness or poor social and economic conditions.[6] Patients have been accepted only on the recommendation of physicians, ministers, social service agencies, or other clinics. Charges for clinic services have been based on the ability of the patient to pay. All charges have been small and many cases have been handled without fees. During the period covered by the study the Committee on Maternal Health operated two clinics: one in the Children's Hospital and one in the parish house of a centrally located Episcopal church.

For the present study an attempt was made to follow up all the white patients who attended the clinics in the five-year period between November, 1929 and December 31, 1934, who were living in metropolitan Cincinnati[7] in the spring of 1935. A new record was obtained from each patient by a trained nurse who conducted all interviews. Each record contained a complete history of fertility from marriage to the date of interview, including the date and type of termination of each pregnancy and the type of contraceptive practice that preceded it. Most patients were seen in their own homes, but a few were interviewed when they returned to the clinic for semi-annual check-up visits. Exhaustive efforts were made to trace all patients, regardless of case status, in order to secure an unbiased series of records. The patients were interested and cooperative, and there is every reason to believe that the records are as accurate as any obtained in a series of medical histories taken by a trained interviewer who has secured the confidence of the patients interviewed.

[6] From the beginning, the clinics dealt with all the aspects of maternal health. Although most of the patients were referred for advice on contraception, many of them were given ambulatory care in the gynecological clinic operated by the committee and some had advice on problems of marital adjustment. Each year a small number of patients has been treated for sterility. The gynecological records of all cases treated in the gynecological clinic were available for the present study.

[7] Metropolitan Cincinnati, as defined for this study, includes those areas shown on Cram's "Official Indexed Street Map of the Cincinnati Area, Including Northern Kentucky Cities." J. Louis Motz News Co., 918 East Court Street, Cincinnati, Ohio, 1936.

THE GROUP STUDIED

The total number of white women who sought contraceptive advice in the first five years of the clinics' existence was 2,439. When the present study was undertaken, it was found that 114 women had never been prescribed for; 21 had died; 221 were living away from Cincinnati; 6 records had been lost, and 54 cases were not available for interview.* The exclusion of these cases left 2,023 available for study, of whom 1,621, or 80.1 per cent, were interviewed.

They were predominantly native-born Protestants who were the wives of manual workers. Nearly 85 per cent were native born of native parentage, and only 6 per cent were foreign born. Both husband and wife were Protestant in nearly 75 per cent of the cases; in 11 per cent the husband and wife had differing religious affiliations; in 12 per cent both were Catholic, and in less than 4 per cent both were Jewish.

About 85 per cent of the couples had spent all of their married lives in cities. The others had lived in villages or rural areas for periods ranging from less than a year to ten or more years. All of them were living either in Cincinnati or very near it at the time of record.

Twenty-five per cent of all the families interviewed were the recipients of relief at the time of record. About one-fourth of the men were employed on work relief projects, but most of the families were receiving direct relief from public funds or private charitable organizations. The median income of nonrelief families was under $1,100 per year. At the time of record only about 5 per cent of the interviewed families had incomes of $2,000 per year or more.

The usual occupation of more than 80 per cent of the husbands was manual labor. Table 1 shows the occupational distributions separately for relief and nonrelief families. Nearly 90 per cent of the families on relief were those of unemployed manual workers.

* These were private patients who had attended the original clinic once or twice, when it was first started, in order to demonstrate their willingness to support it. The Executive Secretary felt that it would be unwise to attempt to include them in the study.

Occupational Class	Per Cent			Number		
	Total	Nonrelief	Relief	Total	Nonrelief	Relief
Total	100.0	100.0	100.0	1,621	1,217	404
Manual Workers	80.9	78.1	89.4	1,312	951	361
Skilled	28.1	27.3	30.4	455	332	123
Semi-skilled	31.8	31.1	34.2	516	378	138
Unskilled[1]	21.0	19.8	24.8	341[1]	241	100
White-Collar Workers[2]	19.1	21.9	10.6	309[2]	266	43

[1] Includes twenty-five men engaged in agricultural pursuits.
[2] Includes forty-four professional men and forty-seven proprietors.

Table 1. Usual occupational class of husbands of clinic patients.

For the analysis of pregnancy rates the sample has been divided into three broad socio-economic groups, according to the usual occupational status of the husband and the income status of the family at the time of interview, in an attempt to secure detailed information concerning the socio-economic differences in fertility within this selected sample. The groups are as follows: (1) relief recipients; (2) nonrelief manual workers; (3) nonrelief white-collar workers.[9]

About 75 per cent of the wives had worked before they were married, most of them as factory operatives, clerical workers, or domestic servants. At the time of record, only 7 per cent of them were gainfully employed outside of the home. Less than 40 per cent of them had had more than an elementary school education. Wives of white-collar workers were better educated than those of manual workers, while wives of men on relief had had less education than those of self-supporting manual workers. Among the white-collar workers, the husbands were better educated than the wives, but in the other groups the wives were a little better educated than their husbands.

[9] For convenience, families in the nonrelief categories will hereinafter be designated simply as "manual workers" and "white-collar workers."

The mean number of pregnancies per woman at the first clinic contact was 4.0 and the mean number of live births 3.3. The average woman was just under twenty when she was married, and had been married less than nine years when she first attended the clinic. There was a wide range in the length of married life at clinic contact. Five per cent of the patients had been married less than a year when they first applied for advice on birth control, but another 5 per cent had been married for more than twenty years. The mean duration of marriage of families on relief was 9.9 years, that of manual workers 9.0 years, and that of white collar workers 6.3 years.

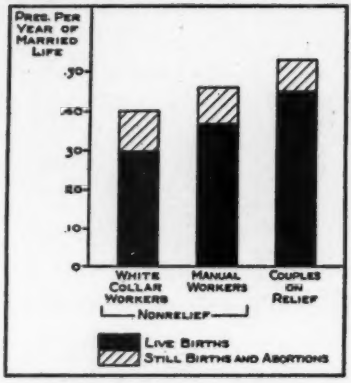


Fig. 1. Preclinic pregnancy rates per year of married life for three social classes.

The standardized birth and pregnancy rates per year of married life for the three social classes, before they sought contraceptive advice, are compared in Figure 1. White-collar workers had the lowest pregnancy and birth rates, and families on relief the highest.[10] In each instance the rates of the clinic patients were high, but the differentials were in the same direction as those reported in other studies.[11] The present investigation is an attempt to learn what factors determined these differences in fertility.

[10] There is a definite selection in this sample toward high birth rates, especially among families on relief, for two reasons: (1) Families with inadequate incomes and many children are those most likely to request and to receive assistance from charitable organizations; (2) families with exceptionally high birth rates are the ones most likely to be referred for contraceptive advice.

[11] Roughly comparable data collected in a field study conducted by the Milbank Memorial Fund in Columbus, Ohio in 1931-1932 yielded the following standardized birth rates per year of married life:

White-collar workers	.17
Skilled and semi-skilled manual workers	.19

THE PREVALENCE OF CONTRACEPTION BEFORE ATTENDANCE AT THE CLINIC

Contraception was not new to these women when they attended the birth control clinic. More than 90 per cent of them had made some attempt to limit their families by its use before they sought expert advice on birth control. They were comparatively slow to begin to use any contraceptive method. Only about 20 per cent of them had started to used contraception before the first pregnancy, and half of them had had two pregnancies before they made any attempt to limit the size of their families. The proportion of couples using contraception increased steadily as marriage lengthened. Table 2 and Figure 2 show in detail the proportion of contraception.

Table 2. Proportion of total exposure to the risk of pregnancy before clinic attendance during which contraception was practiced, by couples married in different periods.[1]

Number of Years Married at Clinic Contact	Year of Marriage	Proportion of Total Exposure during which Contraception was Practiced					
		Total	Before First Pregnancies	After First Pregnancies by Period of Married Life			
				0-4	5-9	10-14	15-29
Total		73.3	35.0	67.3	85.7	86.4	81.0
15-29	1900-1919	68.8	13.4	42.7	74.9	81.9	81.0
10-14	1915-1924	75.8	27.3	59.7	89.1	93.0	—
5-9	1920-1929	75.7	40.3	76.2	92.0	—	—
0-4	1925-1934	75.1	51.3	86.2	—	—	—
		Exposure to Pregnancy in Years, during which Contraception was Practiced					
Total		6,498.4	360.7	2,031.9	2,332.9	1,233.8	539.1
15-29	1900-1919	2,089.2	22.7	241.1	590.2	696.1	539.1
10-14	1915-1924	2,149.4	74.0	473.9	1,063.8	537.7	—
5-9	1920-1929	1,705.8	143.7	883.2	678.9	—	—
0-4	1925-1934	554.0	120.3	433.7	—	—	—

[1] In this table, 9.8 years of exposure, during which contraception was temporarily interrupted in order to plan pregnancy, were omitted from the totals.

in the total exposure to the risk of pregnancy,[22] of women married different lengths of time when they sought expert advice on birth control. Each set of bars shows the proportion of contraceptive practice in successive periods of married life of a single group of women. Each group practiced more and more contraception as marriage lengthened. In each period of married life contraception was least used by the oldest couples and most used by the youngest. In the period immediately preceding attendance at the clinic (represented by the lowest bar in each set), all couples practiced contraception for more than 80 per cent of the exposure to pregnancy, regardless of the length of their married life.

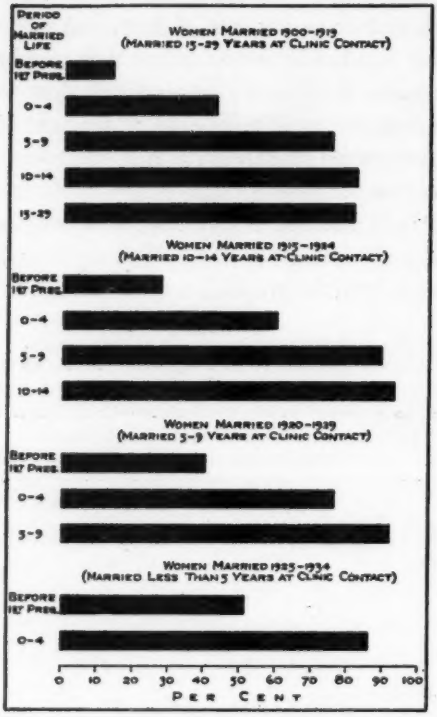


Fig. 2. Proportion of the total exposure to the risk of pregnancy before clinic attendance during which contraception was used by couples married in different periods.

The use of contraception varied by social class. Table 3 shows the proportion of exposure and of pregnancies occurring when contraception was used and when none was used,

[22] Exposure to the risk of pregnancy was that period during which each woman was living with her husband and not pregnant or in the puerperium. In each period of married life, the exposure and pregnancies were those of all women who were exposed to the risk of pregnancy within the period.

Exposure and Pregnancies	All Couples	Couples Not on Relief		Couples on Relief
		White-Collar Workers	Manual Workers	
Total Years Exposed to Risk of Pregnancy	8,875.8	1,135.5	5,426.2	2,316.1
Per Cent of Exposure				
Total	100.0	100.0	100.0	100.0
Contraception Used	73.2	82.4	74.8	64.9
No Contraception Used (Total)	26.8	17.6	25.2	35.1
Habitually	26.7	17.3	25.1	35.0
Temporarily[1]	0.1	0.3	0.1	0.1
Total Pregnancies	6,409	691	3,751	1,967
Per Cent of Pregnancies				
Total	100.0	100.0	100.0	100.0
Contraception Used	56.7	61.9	57.7	52.9
No Contraception Used (Total)	43.3	38.1	42.3	47.1
Habitually	42.2	33.9	41.4	46.6
Temporarily[1]	1.1	4.2	0.9	0.5

[1] Contraceptive practice deliberately interrupted in order to permit pregnancy to occur.

Table 3. Proportion of total exposure and pregnancies before clinic attendance during which contraception was used, and during which none was used, for three social classes.

for each social class and for the whole group. Figure 3 depicts graphically the differences in the proportions of contraception in the exposures of the three social classes. Couples who were being supported by relief agencies at the time of record had used contraception for less than 65 per cent of their total exposure before attending the clinic. Among the self-supporting couples, manual workers used contraception for nearly 75 per cent of the preclinic exposure to pregnancy, and white-collar workers for more than 80 per cent. These figures are in

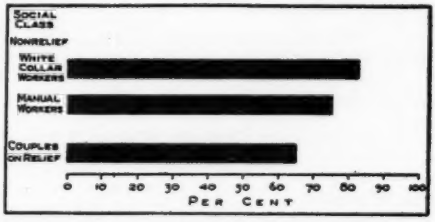


Fig. 3. Proportion of the total exposure to the risk of pregnancy before clinic attendance during which contraception was used by three social classes.

inverse ratio to the observed social class differentials in the birth rates. The differences were even greater than these proportions show, since white-collar workers had been married for a shorter time than either manual workers or couples on relief when they first attended the clinic. The number of deliberately planned pregnancies was small in all three groups, but the proportion of planned pregnancies was much higher among white-collar workers than among the couples in either of the other socio-economic groups.

Table 4. Preclinic pregnancy rates for three social classes when no contraception was used.

Period of Married Life	All Couples	Couples Not on Relief		Couples on Relief
		White-Collar Workers	Manual Workers	
	Pregnancy rates per 100 years' exposure			
First Pregnancies	167	136	162	199
All Later Pregnancies	93	101	93	92
Years Since Marriage				
0-4	99	108	96	102
5-9	94	—*	101	87
10-14	79	—*	71	88
15-29	67	—*	70	64
	Mean number of months of exposure per pregnancy			
First Pregnancies	7.2	8.8	7.4	6.0
All Later Pregnancies	12.9	11.8	12.9	13.0
Years Since Marriage				
0-4	12.1	11.1	12.5	11.8
5-9	12.7	—*	11.9	13.8
10-14	15.3	—*	16.8	13.7
15-29	17.8	—*	17.1	18.8

	Number of years of exposure and number of pregnancies							
	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.
First Pregnancies	670.9	1,121	100.4	137	414.3	673	156.2	311
All Later Pregnancies	1,696.4	1,583	95.7	97	945.3	880	655.3	606
Years Since Marriage								
0-4	987.7	980	80.4	87	566.8	546	340.5	347
5-9	387.7	365	11.0	7	216.5	219	160.2	139
10-14	194.6	153	3.4	2	102.2	73	88.9	78
15-29	126.4	85	0.9	1	59.7	42	65.7	42

* Insufficient exposure.

THE UNCONTROLLED FERTILITY OF THE GROUP

Pregnancy rates were computed for three types of exposure to the risk of pregnancy: (1) exposures during which there was no attempt at contraception, (2) exposures during which contraception was used more or less regularly, and (3) exposures during which contraception was deliberately interrupted in order to permit pregnancy to occur.[13]

Pregnancy rates for periods when no contraception was used are shown in Table 4. The average woman in the group, who used no contraception, became pregnant for the first time about seven months after her marriage. The mean number of months of exposure for each later pregnancy varied from a year to a year and a half. The rates declined markedly immediately after the first pregnancy, probably because of periods of lactation and puerperal amenorrhea which followed each pregnancy, but could not precede the first. The subsequent decline was relatively small but consistent.

Exclusion of the exposure and pregnancies of women who had histories of serious gynecological disease or had been treated in the gynecological clinic resulted in higher rates in all durations of marriage.[14] The same type of decline was observed in these rates for the whole group. In neither the whole group nor the group free of gynecological disease was there a significant decline in fecundity until after the tenth year of married life.[15]

[13] There was so little exposure of this type that no reliable rates could be computed. The total was only one-tenth of one per cent of the entire preclinic exposure.

[14] The rates were as follows when the pregnancies and exposure of all cases with known pathology were excluded:

	Rate	*Exposure Years*	*No. Pregnancies*
First Pregnancies	189	434.8	821
All Later Pregnancies	96	1,277.5	1,229
Years Since Marriage			
0-4	102	733.2	747
5-9	99	284.7	282
10-14	82	150.6	123
15-29	71	108.9	77

[15] In the comparison of rates for the whole group for successive periods of married life, the χ^2 test yielded the following results:

0-4 not significantly different from 5-9, p = between .30 and .50

(Continued on page 80)

Selection appears to have been a substantial factor in the decline in pregnancy rates after the tenth year of married life. The pregnancy rates of women who used no contraception until after they had been married ten years or longer are compared with those of all other women in Table 5 and Figure 4. Women who started to use contraception at any time between marriage and the tenth year of married life had noncontraceptive pregnancy rates which were significantly higher than those of women who delayed the use of contraception until after they had been married ten years or more. This was true of rates for the first pregnancy as well as of rates for later pregnancies. It appears, therefore, that women who delayed the use of contraception were apparently less in need of it than those who made some attempt at family limitation earlier in their

Table 5. Preclinic pregnancy rates of two groups of women when no contraception was used.

Period of Married Life	Pregnancies Per 100 Years' Exposure	Exposure Years	Number of Pregnancies
	A. WOMEN WHO HAD EXPOSURE WITHOUT CONTRACEPTION AFTER THE TENTH YEAR OF MARRIED LIFE		
First Pregnancies	115	77.7	89
All Later Pregnancies Years Since Marriage			
0-4	82	190.5	157
5-9	75	237.0	178
10-14	79	194.6	153
15-29	67	126.4	85
	B. WOMEN WHO HAD NO EXPOSURE WITHOUT CONTRACEPTION AFTER THE TENTH YEAR OF MARRIED LIFE[1]		
First Pregnancies	174	593.2	1,032
All Later Pregnancies Years Since Marriage			
0-4	103	797.2	823
5-9	124	150.7	187

[1] This group includes all women married less than ten years as well as women married more than ten years who practiced contraception without interruption after the tenth year of married life.

5-9 possibly higher than 10-14, p=between .05 and .10
10-14 not significantly different from 15-29, p=between .20 and .30
5-9 higher than 15-29, p= <.01
0-4 higher than 15-29, p= <.01
The differences were of the same order when the pathological cases were excluded.

married lives.[16] When the noncontraceptive pregnancy rates of the two groups are separately considered, neither set of rates shows a significant decline with increasing length of marriage, excepting that immediately following the first pregnancy.[17]

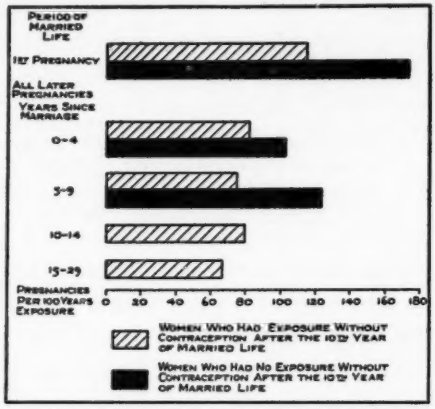


Fig. 4. Preclinic pregnancy rates of two groups of women when no contraception was used.

A comparison of pregnancy rates for the three social classes when no contraception was used (Table 4) shows significant differences in pregnancy rates for the first pregnancy by social class.[18] The rates of the wives of white-collar workers were lowest and those of the wives of men on relief highest. When the exposure and pregnancies of pathological cases were excluded from the tabulations, the differences were less marked. There were no significant differences in pregnancy rates by social class after the first pregnancy, either for the whole group or for the nonpathological cases.[19]

[16] The possibility of incomplete or inaccurate reporting of early pregnancies may also be a factor in the lower rates of older women.

[17] When rates for two periods of married life were tested by the χ^2 test, the values of p for women who continued to use no contraception after the tenth year of married life were as follows:

0-4 not significantly different from 5-9, p = between .30 and .50

0-4 not significantly different from 15-29, p = between .10 and .20

[18] When the rates for the three social classes were compared, the χ^2 test yielded the following results:

Labor significantly higher than white collar, p = between .02 and .05

Relief significantly higher than labor, p = <.01.

[19] The χ^2 test was used to test rates for each period of married life, for the three social classes. For all comparisons, p varied between .10 and .90, and none of the differences was significant.

Coital Frequency	Pregnancies Per 100 Years' Exposure	Mean No. Months Between Marriage and First Conception	Exposure Years	Number of Pregnancies
Total[1]	190	6.3	421.8	800
2 x Week or Less	143	8.4	35.7	51
3 x Week	174	6.9	268.6	468
4 x Week	233	5.2	96.2	224
5 x Week or More	268	4.5	21.3	57

[1] All cases for which coital frequency was known.

Table 6. Pregnancy rates for the first pregnancy when no contraception was used, by coital frequency (nonpathological cases only).

The influence of coital frequency on the first pregnancy rates of women free of gynecological disease, when no contraception was used, is shown in Table 6. There was a consistent decline in the mean number of months between marriage and the first conception, with increasing frequency of coitus. The rates were significantly higher with frequencies of four times per week or more than with frequencies of three times per week or less, but the data were insufficient to show any more detailed differences.[20] These findings must be interpreted with caution, since the reported frequency of coitus immediately after marriages which took place five years or more before the time of record is subject to wide error.[21]

The uncontrolled fertility of the group, as expressed in pregnancy rates when no contraception was used, is the yardstick by which we may measure the effectiveness of the contraception used. A contraceptive method may be thought of as effective in the degree to which it reduces the risk of conception during a given ex-

[20] The rates for successive frequencies were tested by the χ^2 test. Values of p follow:
2 x week or less not significantly different from 3 x week, p = between .10 and .20.
3 x week lower than 4 x week, p = <.01
4 x week not significantly different from 5 x week or more, p = .30

[21] For detailed discussion of the limitations of this tabulation, *see* Stix, Regine K.: The Medical Aspects of Variations in Fertility. *American Journal of Obstetrics and Gynecology*, April, 1938, xxxv, No. 4, pp. 577-578.

posure. This reduction in risk is shown by the estimated number of pregnancies prevented, i.e., the difference between the number of pregnancies observed during the exposure with a given contraceptive and those expected had no contraception been used. The proportion of pregnancies prevented may be taken as a measure of the effectiveness of the contraceptive.

The selections shown in Table 5 and discussed on page 80 make it necessary to provide an adjusted base against which the effectiveness of contraception may be measured.

Women who felt the need of using contraception to control their fertility early in their married lives were apparently more fecund than those who delayed the use of contraception until after the tenth year of married life. The effectiveness of the contraception used early in married life by the more fecund women must therefore be measured in terms of the fecundity of that group rather than of the whole group, if its effectiveness is not to be underestimated. The pregnancy rates, on the basis of which effectiveness will be measured, have therefore been computed as follows: For the first pregnancy and all experience prior to the fifth year of married life, the noncontraceptive rates are those of women free of gynecological disease who started the use of contraception before the fifth year of married life. For the 5 to 9 year experience, the rate is the noncontraceptive rate, for the period, of women who first used contraception between the fifth and tenth years of married life. After the tenth year of married life the noncontraceptive rates of all women free of gynecological disease must be used, because exposure without contraception in these periods was small.[22]

If it is true that the most fecund women are those who use

[22] The standard used follows:

	Rate	*Exposure Years*	*No. of Pregnancies*
1st pregnancy	205	307.2	629
0- 4	123	385.2	475
5- 9	126	101.1	127
10-14	82	150.6	123
15-29	71	108.9	77

contraception earliest, the use of this adjusted standard of noncontraceptive exposure is justified because it approaches most nearly to the ideal standard whereby it is possible to measure the effectiveness of the contraception used by a given group of women on the basis of the noncontraceptive pregnancy rates of those same women.

THE EFFECTIVENESS OF CONTRACEPTION BEFORE ATTENDANCE AT THE CLINIC

Coitus interruptus, condom, and douche were the contraceptives most frequently used by the group before they went to the clinic. The proportion of the exposure with contraception during which each type of contraception was used is shown in Table 7. There were marked social class differences in the types of contraception used. White-collar workers used condom for nearly 40 per cent of their exposure with contraception, while couples on relief used either coitus interruptus or douche—the least costly contraceptives—for more than 70 per cent of the exposure during which contraception was used. Manual workers used condom less than white-collar workers and coitus interruptus and douche less than relief recipients.

Table 7. Proportion of total preclinic exposure with contraception during which each type of contraception was used by three social classes.

Type of Exposure With Contraception	All Couples	Couples not on Relief		Couples on Relief
		White-Collar Workers	Manual Workers	
Total Number of Years	6,498.4	933.6	4,061.4	1,503.4
Per Cent				
Total	100.0	99.9	100.0	100.0
Condom	23.9	38.3	23.9	14.6
Coitus Interruptus	35.8	29.6	35.3	41.2
Douche	23.0	15.1	22.2	30.3
All Other Contraception[1]	17.3	16.9	18.6	13.9

[1] Includes all use of suppository, pessary, jelly, intrauterine device, sponge, and all alternations of two or more methods of contraception.

Period of Married Life	All Couples	Couples not on Relief		Couples on Relief	
		White-Collar Workers	Manual Workers		
	Pregnancies per 100 years' exposure				
First Pregnancies	70	59	66	138	
All Later Pregnancies	55	44	53	68	
Years Since Marriage					
0-4	61	54	59	78	
5-9	53	40	51	65	
10-14	50	33	48	65	
15-29	49	38	48	53	
	Number of years of exposure and number of pregnancies				
	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.
First Pregnancies	360.8	254	100.3	59	229.2	152	31.2	43
All Later Pregnancies	6,137.9	3,379	833.4	369	3,832.3	2,012	1,472.2	998
Years Since Marriage								
0-4	2,032.0	1,264	333.2	179	1,250.3	734	448.4	351
5-9	2,333.0	1,227	342.2	136	1,440.6	732	550.2	359
10-14	1,233.8	623	126.7	42	790.5	376	316.7	205
15-29	539.1	265	31.3	12	350.9	170	156.9	83

Table 8. Preclinic pregnancy rates for three social classes, when contraception was used.

Pregnancy rates when contraception was used were significantly lower than those when none was used, but the differences were not great. The rates of white-collar workers were lowest and those of families on relief highest (Table 8). Rates for individual contraceptives (Table 9) showed marked differences. Those for condom were much lower than the rates for any other type of contraception, while those for douche did not differ significantly from pregnancy rates when no contraception was used.[20]

The social class differences in pregnancy rates with contraception

[20] When the χ^2 test was used to compare rates for two types of contraception, as used in the same period of married life, values of p were as follows:
Condom lower than "other contraception," 0-4, $p = <.01$
Douche not significantly different from no contraception, 5-9, p = between .10 and .20.

Period of Married Life	Condom		Coitus Interruptus		Douche		All Other Contraception	
	Pregnancies per 100 years' exposure							
First Pregnancies	25		103		126		45	
All Later Pregnancies	23		61		87		45	
Years Since Marriage								
0-4	29		65		92		47	
5-9	19		59		85		46	
10-14	22		58		81		43	
15-29	13		59		77		36	
	Number of years of exposure and number of pregnancies							
	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.	Exp.	Preg.
First Pregnancies	128.2	32	65.9	68	97.7	123	69.0	31
All Later Pregnancies	1,422.8	321	2,263.2	1,373	1,399.5	1,216	1,052.3	469
Years Since Marriage								
0-4	447.7	132	660.8	428	594.7	549	328.7	155
5-9	566.7	108	904.3	536	478.1	407	383.9	176
10-14	303.8	67	497.9	291	208.3	169	223.7	96
15-29	104.5	14	200.2	118	118.3	91	116.0	42

Table 9. Preclinic pregnancy rates for each type of contraception.

were due to two factors: (1) the fact that white-collar workers used relatively effective contraception, manual workers fairly effective contraception, and relief recipients mainly ineffective contraception, and (2) the fact that with the exception of douche, the self-supporting couples used each type of contraception more effectively than the couples on relief.[24] (Table 10.)

The effectiveness of contraception in reducing the risk of preg-

[24] χ^2 tests on the total rates for each contraceptive as used by the three social classes yielded the following results:

Condom: labor higher than white collar, $p = <.01$
relief higher than labor, $p = <.01$

Coitus interruptus:
white collar and labor not significantly different, p = between .30 and .80
relief higher than labor, $p = <.01$
relief higher than white collar, p = between .02 and .05.

Type of Contraception	Pregnancy Rates			Exposure and Pregnancies					
	Couples Not on Relief		Couples on Relief	Couples Not on Relief				Couples on Relief	
	White-Collar Workers	Manual Workers		White-Collar Workers		Manual Workers			
				Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.
All Contraception	46	53	69	933.7	428	4,061.6	2,164	1,503.4	1,041
Condom	15	22	40	358.1	53	972.7	211	220.2	89
Coitus Interruptus	59	60	68	276.8	164	1,432.7	856	619.6	421
Douche	108	87	89	140.7	152	901.2	781	455.2	406
All Other Contraception	37	42	60	158.2	59	754.8	316	208.3	125

[1] Standardization did not affect these rates significantly.

Table 10. Total pregnancy rates for each type of contraception by social class.[1]

nancy is shown in Table 11. All contraception, as used by the whole group, prevented about half the pregnancies which would have occurred had no contraception been used for exposures of equal length and distribution. Condom was the only single contraceptive which was highly effective. Among white-collar workers the use of condom was 88 per cent effective in reducing the risk of pregnancy, and even among couples on relief its use reduced the risk of pregnancy by about 65 per cent.

The factors underlying the differences in the total pregnancy

Table 11. Per cent of effectiveness of each type of contraception as used by three social classes.[1]

Type of Contraception	All Couples	Nonrelief		Couples on Relief
		White-Collar Workers	Manual Workers	
All Contraception	52.0	63.5	54.2	38.0
Condom	80.9	88.3	81.6	64.5
Coitus Interruptus	45.4	52.1	47.4	36.8
Douche	25.2	16.0	27.6	23.2
All Other Contraception	61.4	70.0	63.4	46.6

[1] Ratio of pregnancies prevented to those expected had no contraception been used. (For further explanation, *see* Stix and Notestein, *op. cit.*, 1934, p. 67.)

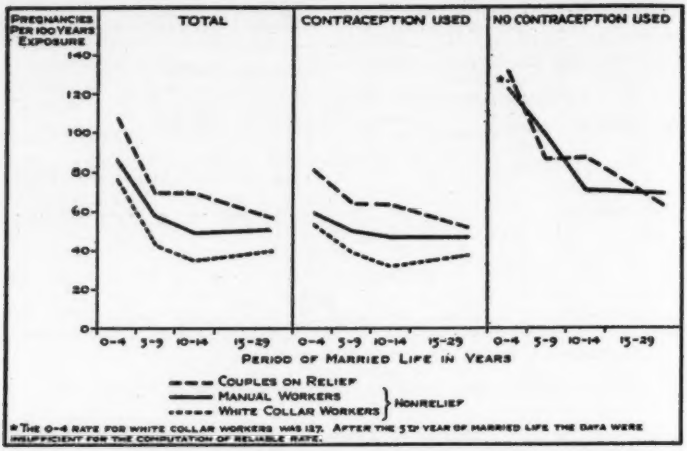


Fig. 5. Preclinic pregnancy rates per 100 years' exposure for three social classes.

rates per one hundred years' exposure of the three social classes are shown graphically in Figure 5. When no contraception was used, the pregnancy rates of the three groups were essentially the same. When contraception was used, they differed in all durations of married life. The differences in the total rates were due partly to these differences in the effectiveness of contraceptive practice and partly to differences in the prevalence of contraception in the exposure of the three groups.

Table 12. Preclinic pregnancy terminations when contraception was used and when none was used.

Type of Termination	All Pregnancies	No Contraception Used	Contraception Used	Exposure Unknown[1]
Number of Pregnancies	6,554	2,776	3,633	145
Per Cent of Pregnancies Terminating In				
Live Births	81.9	89.3	75.8	93.8
Illegal Abortions	7.5	1.2	12.6	2.1
Other Wastage[2]	10.5	9.5	11.6	4.1

[1] Premarital pregnancies.

[2] Spontaneous and therapeutic abortions and stillbirths.

PREGNANCY WASTAGE

The women who used contraception did so because they wished to be able to control the size of their families. When pregnancy occurred in spite of the use of contraceptives many women resorted to induced abortion. Illegal abortion was ten times as frequent in the termination of accidental pregnancies as in the termination of pregnancies which occurred when no contraception was used (Table 12 and Figure 6). The resort to abortion when contraception proved inadequate has been observed in other groups.[28]

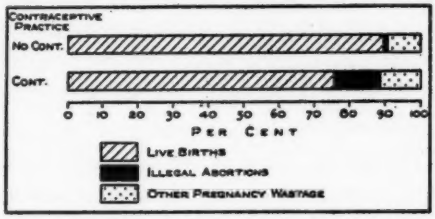


Fig. 6. Preclinic pregnancy terminations when contraception was used and when none was used.

Abortion was most frequent among white-collar workers and least frequent among families on relief (Table 13). As reported in an earlier paper,[29] there was also a direct association between income level and the proportion of pregnancies illegally aborted, and a marked rise in the proportion of illegal abortions with increasing order of pregnancy.

Involuntary pregnancy wastage was approximately the same in the three social class groups, and showed no significant difference with the use or non-use of contraception, with changing order of pregnancy or with differences in income.

In the five-year period immediately preceding clinic contact there was a slight rise in the proportion of accidental pregnancies terminated by abortion. Only 73 per cent of the accidental pregnancies

[28] Stix, Regine K.: A Study of Pregnancy Wastage. The Milbank Memorial Fund *Quarterly*, October, 1935, xiii, No. 4, p. 357.

Pearl, Raymond: Fertility and Contraception in New York and Chicago. *Journal of the American Medical Association*, April 24, 1937, cviii, Table 5.

[29] See Stix, Regine K. and Wiehl, Dorothy G.: Abortion and the Public Health. *American Journal of Public Health*, May, 1938, xxviii, No. 5, Figures 1 and 2, and pp. 623-624.

Type of Termination	Total	Couples not on Relief		Couples on Relief
		White-Collar Workers	Manual Workers	
Number of Pregnancies	6,554	703	3,838	2,013
Per Cent of Pregnancies Terminating In				
Live Births	81.9	76.7	81.4	84.8
Illegal Abortions	7.5	13.1	8.1	4.5
Other Wastage[1]	10.5	10.2	10.5	10.7

[1] Spontaneous and therapeutic abortions and stillbirths.

Table 13. Preclinic pregnancy terminations by social class.

occurring in this period terminated in live births as compared with 77 per cent of all other preclinic pregnancies. This is indirect evidence of a special interest in family limitation which was soon to bring these women to the birth control clinic.

SUMMARY

About 80 per cent of the white patients who attended the clinics of the Cincinnati Committee on Maternal Health in the five-year period ending December 31, 1934, were interviewed by a trained nurse in a follow-up study conducted by the Milbank Memorial Fund. The women interviewed were mainly Protestants of native birth whose husbands were usually occupied at manual labor. One-fourth of the families were on relief at the time of interview.

Most of the group had used some form of contraception before attending the clinic, but the greater proportion had delayed its use until after the first or second pregnancy. Among the self-supporting couples, white-collar workers used contraception for a larger proportion of their exposure to pregnancy than manual workers. Couples on relief used contraception for a smaller proportion of their exposure than either of the self-supporting groups.

When no contraception was used, pregnancy rates for the first pregnancy differed slightly by social class. White-collar workers had the lowest rates and couples on relief the highest. After the first

pregnancy the rates of the three groups showed no difference. Women who were highly fecund, in all groups, used contraception earlier than those whose fecundity was relatively low.

The differences in the fertility of the three social classes were due mainly to the amount and effectiveness of the contraception used in each group. Condoms, the most effective type, were used most by white-collar workers and least by couples on relief. The use of all contraception prevented about 52 per cent of the pregnancies which would have occurred had the group used no contraception for a similar period of exposure. In almost every instance, contraception was used more effectively by the self-supporting workers than by the relief recipients. Condoms were 88 per cent effective when used by white-collar workers, 82 per cent when used by manual workers, and only 65 per cent when used by relief recipients.

When contraception failed many women resorted to induced abortion. Abortion increased with increasing income and order of pregnancy and varied by social class. The proportion of pregnancies terminating in unavoidable pregnancy wastage showed little or no variation by order of pregnancy, income, or social class, and was the same among accidental pregnancies as among those which occurred when no contraception was used. A rise in the proportion of accidental pregnancies which were terminated by induced abortion in the period immediately preceding attendance at the clinic points to the probability that many women came to the clinic because they needed more satisfactory methods of family limitation than the ones available to them.

ELEVATED SYSTOLIC BLOOD PRESSURE IN A RURAL POPULATION

RALPH E. WHEELER, M.D.[1]

THE factors giving rise to elevated blood pressure have been intensively studied in clinic and laboratory, but seldom in relation to other findings in a general population. It therefore seemed useful to undertake a general study of medical examinations performed in rural Cattaraugus County with a view to ascertaining what the small group with this finding might show in greater or less degree than the total examined sample.

The medical records used for this study were made under the auspices of the Milbank Memorial Fund and the United States Public Health Service at an examining clinic in a rural area of Cattaraugus County, New York. The farm and small village inhabitants of the neighborhood were invited to attend for a health examination, and about a fifth of the population attended. While some undoubtedly came to verify a suspicion of illness, it is felt that a large proportion came in a spirit of cooperation. A more detailed statement of the type of individual examined and of the method of examination will be found elsewhere.[2]

The most significant limitation of these data lies in the fact that in the majority of instances the blood pressure was taken only at the time of examination and might have been unusually low or high at that time. Blood pressures which were elevated were often taken twice during the course of the examination, however, to make sure that the reading was not merely a result of apprehension on the part of the patient.

Rates for persons whose upper or systolic level of blood pressure exceeded 160 mm. of mercury have been recorded in the more gen-

[1] From the Milbank Memorial Fund.

[2] Wheeler, Ralph E.: Impairments in a Rural Population. The Milbank Memorial Fund *Quarterly*, July, 1937, xv, No. 3, pp. 248-261.

Age	Number Examined		Systolic Pressure of 160+ mm.			
			Number		Per Cent	
	Male	Female	Male	Female	Male	Female
5+	385	475	38	80	9.9	16.8
5-14	69	68	0	1	0.7	0.5
15-29	81	135	1	0		
30-44	91	118	5	9	5.5	7.6
45-59	83	100	12	35	14.4	35.0
60+	61	54	20	35	32.8	64.8

Table 1. Number examined, and number and percentage of persons found to have a systolic blood pressure of 160 mm. or more, by age and sex.

eral discussion of findings.[8] The essential data are reproduced in Table 1, by age and sex. They show a definite excess among females at ages after 45 years and a tendency in both sexes to increase rather rapidly with age.

Because examination was voluntary, it may well be asked whether this represents a true picture of the prevalence in this population or whether the rather high figures, particularly for elderly women, indicate that the clinic sample was biased by the inclusion of a disproportionate number of cases with high blood pressure. Unfortunately, no definite answer can be given, although there is some evidence supporting the view that these data are biased. There were 422 persons above the age of thirty years who were under observation in a morbidity survey conducted by the United States Public Health Service in the area in question. By the method of periodic house-to-house canvass, this survey collected data on the illnesses, acute and chronic, of more than 5,000 persons in the area where medical examinations were performed. The assembled data were made available for a comparative study through the kindness of Mr. Selwyn D. Collins of the Office of Statistical Investigations of the United States Public Health Service. It was found that 188 of the total of 2,794 persons above thirty years of age in the area, or

[8] Wheeler, Ralph E.: Impairments in a Rural Population. IV. The Milbank Memorial Fund *Quarterly*, April, 1938, xvi, No. 2, pp. 192-217.

6.7 per cent, reported "high blood pressure,"[4] while 39 of the 422 persons examined in the clinic, or 9.2 per cent, reported to the survey that they had "high blood pressure."

This could be interpreted as showing a definite bias in at least that part of the examined group which was included in the survey. However, rates for females reporting "high blood pressure" to the survey workers were 9.4 per cent and 8.4 per cent for the examined and total survey populations, respectively; those for males were 9.1 and 5.2 per cent. Females, therefore, showed an excess of only 10 per cent in the examined group while males showed an excess of 75 per cent.[5] The excess is clearly of a type which most markedly affects the male rates.

The results of medical examinations, moreover, were often explained to the patients, and it is known that patients sometimes reported these results to the survey workers *after* their examinations so that the excess is not entirely due to a foreknowledge of the ailment. In addition, it is believed that those who cooperated with the medical clinic were also more cooperative in stating their ailments to the survey workers, and this could explain in part the excess.

The available data on blood pressure measurements in population samples are rather limited—perhaps because of doubt as to the validity of presenting figures based on a single measurement. However, age-specific rates for urban male office and industrial workers are available in the Life Conservation Studies,[6] and these rates are not widely at variance with those for males in the present series.

[4] In the survey data "high blood pressure" was combined with arteriosclerosis. This is, however, the only category which throws light on this point and it is known that reports were very largely of high blood pressure.

[5] A correction should properly be made for age as the group of 422 persons examined during the period of the survey showed definite age differences, even among those over the age of thirty years. When this correction is made, females showed a 37 per cent, and males a 93 per cent, excess in the examined group.

[6] A series of publications, 1929-1930, of the Heart Council of Greater Cincinnati (312 West Ninth Street, Cincinnati). The first two parts cover office workers and industrial workers, respectively. Nearly comparable data are also to be found in Public Health Bulletin No. 162, June, 1926: A report by R. H. Britten and L. R. Thompson on a Health Study of Ten Thousand Industrial Workers.

Although the survey data, therefore, offer some evidence for the view that the sample is biased, there is not a little support for the opinion, of at least one examiner, that the chief limitation of the prevalence figures is the fact that individuals were rated on the basis of a single test.

For the more intensive study of the group of persons with this finding, it was considered advisable to include all those with a blood pressure of 150 mm. or higher. While this figure is 10 mm. lower than that used for the prevalence studies, it was felt that the lower base would include enough individuals with at least potentially elevated blood pressure to make up for the inclusion of a few persons with merely a high normal rating. The term "elevated" systolic pressure is, therefore, used to define the outstanding feature of this group. It was also necessary to exclude ages under thirty years because of the limited number of cases.[7]

The number of persons with systolic pressures of 150 or more after the age of thirty years are shown for broad age groups by sex in Table 2. The figures for males, even on the broader basis of 150, are seen to be limited, and this necessitates the employment of a somewhat indirect method of analysis for the prevalence in this group of other conditions determined by the medical examination—that of applying rates for the given condition in the examined population to the elevated pressure group and comparing the expectancy so obtained with the actually observed number. By this method, when the observed exceeds the expectancy, there is indicated a positive relationship; when the reverse is true, a negative or

[7] Excluded, therefore, were the following cases:

Age	*Male*	*Female*
5-14	0	1
15-29	8	1
5-29	8	2

Only one male, aged 21 years, and one female, aged 11 years, showed systolic blood pressure above 160 mm. These two showed high diastolic pressures also. The remaining cases in these two age groups had elevated systolic pressures only.

inverse relationship is suggested. Age is an important general factor, and because the mean age of the elevated blood pressure group is somewhat higher than that of others above the age of thirty years,* broad age groups of fifteen years are used to minimize errors that may arise from a simple comparison.

Table 2. Number of males and females at ages above 30 years with systolic blood pressures of 150 mm. or higher.

Age	Male	Female	Both Sexes
30+	53	108	161
30-44	8	20	28
45-59	19	48	67
60+	26	40	66

It may be noted that the possibility of a bias in the incidence data does not detract from the validity of this approach. Comparisons of this type may be made with any examined group containing a sufficiently large subgroup with a specified finding. Thus, hospital or outpatient studies could be made from most of the points of view mentioned below, the chief qualification being that all the examinees should have been under comparable types of observation.

The first significant relationship which appears in this group is that with sex. The number of females which might be expected in the total elevated blood pressure group on the basis of the percentage of women in the examined group is shown in Table 3, the expected number being simply obtained by applying the percentage of females in the total examined group (Table 1) at each age to the total for both sexes (Table 2) at that age in the high blood pressure group.

The ratio of observed to expected is 1.3; that is, some 30 per cent more females were found in the elevated group than would have been expected. When it is remembered that the bias, if any, is in the direction of males in this sample, these rural data may be taken as conforming with other observations on the greater prevalence of hypertension among women.

* The mean age of males above the age of thirty years with elevated blood pressure is 59.4 years while that of all examined males above that age is 51.1 years. For females the mean ages are 55.4 and 48.6 years, respectively.

In a more general discussion[9] it was stated that the relationship between high blood pressure and sex might be an indirect one as overweight is related to both. The solution of this question is beset with difficulties for neither elevated pressure nor degrees of over or underweight are measured with a high degree of accuracy. However, some significant relationships do appear between relative weight[10] and elevated pressure, as shown in Table 4. The expected number is uniformly lower than the observed for 20 per cent overweight in the six age samples of the two sexes, and uniformly higher for 10 per cent underweight. In other words, elevated systolic pressure is associated more frequently with overweight, less frequently with underweight, than is to be expected on the basis of the proportions of such individuals in the entire examined group. The relationship appears to be more definite for females than for males but seems to be obscure at ages above 60 years.

Table 3. Observed number of females at ages above 30 years with systolic blood pressures of 150 mm. or more, and expected number based upon percentages of females in total examined group.

Age	Observed Number	Expected Number	Per Cent Examined of Female Sex
30+	108	83.4	—
30-44	20	15.8	56.4
45-59	48	36.6	54.6
60+	40	31.0	46.9

The variations of blood pressure with weight have been presented for males by Britten,[11] in considerably more detail than the limited data of the present study permit, and useful data are also to be found for employed males in the Life Conservation Studies,[9] but similar studies for females are not available so that it may be useful to give the weight and blood pressure data in some detail for

[9] Wheeler, *op. cit.*, 1938.

[10] The difference between observed and standard weight for height, age, and sex, in relation to the standard weight.

[11] Britten, Rollo H.: A Study of Medical Examination Records of 3,037 Men Markedly Under or Overweight for Height and Age. *Public Health Reports*, August 4, 1933, xlviii, No. 31, pp. 926-944.

Age	Systolic Pressure of 150+ mm. and Known Weight		20 Per Cent or More Overweight				10 Per Cent or More Underweight			
			Male		Female		Male		Female	
	Male	Female	Observed	Expected	Observed	Expected	Observed	Expected	Observed	Expected
30+	50	104	7	5.4	50	37.7	6	10.5	4	13.3
30-44	7	18	1	0.6	12	5.8	0	1.1	0	3.1
45-59	18	47	3	2.4	22	16.7	0	2.4	1	4.4
60+	25	39	3	2.4	16	15.2	6	7.0	3	5.8

Table 4. Number with systolic blood pressure of 150 mm. or more and known relative weight record, observed and expected numbers with specified degree of over or underweight, by age and sex.

the entire examined group. This has been done in Table 5 where the percentage of persons with elevated systolic pressure in three weight groups is presented by age and sex. The figures increase quite consistently with age in all weight groups; they increase with relative weight to some extent for males and quite definitely for females, but the oldest age groups for both sexes show this latter much less consistently. The other aspect of the relationship—that lower blood pressures are related to underweight—does not fall

Table 5. Number of examined persons overweight, normal, and underweight, by age and sex, and the percentage of individuals in each weight group with systolic blood pressure of 150 mm. or more.

Age	Male			Female		
	20 Per Cent or More Overweight	+19 to −9 Per Cent Normal	10 Per Cent or More Underweight	20 Per Cent or More Overweight	+19 to −9 Per Cent Normal	10 Per Cent or More Underweight
	Per cent with systolic pressure of 150 mm. or more					
30-44	12.5	9.2	—	31.6	10.9	—
45-59	27.3	25.4	—	62.8	43.6	11.1
60+	50.0	43.2	37.5	80.0	80.0	37.5
	Number examined					
30-44	8	65	13	38	55	21
45-59	11	59	10	35	55	9
60+	6	37	16	20	25	8

within the limits of the present paper, but it may be stated that there is evidence that this relationship is also quite definite.[12]

These figures, of course, raise the question whether the relationship brought out is an actual one or whether it simply demonstrates an error inherent in clinical methods of testing systolic pressure in persons of varying weight. Such a question cannot be answered by field data of this type except to point out that they hold true when the systolic level for elevated pressure is 160 as well as when it is 150. The limited number of cases in this series makes it difficult to carry the relationship through higher systolic levels, but if there is an error in clinical methods of measurement, it would appear to be of a larger order than 10 mm.

These facts about overweight and elevated pressure, taken together with the fact that an appreciably larger proportion of women than of men were in the overweight group,[13] help to explain the observed excess among females, even though they do not fully clarify all the issues.

In addition to sex and overweight, there are a number of other medical examination findings which are felt to be associated with elevated blood pressure in some degree. An extensive comparison of several conditions covered by the examination was therefore undertaken. In Table 6 appear the expected, contrasted with the observed,

[12] For the examined population given in Table 5 the percentages of persons with systolic pressure below 120 mm. for the three groups overweight, normal, and underweight, are respectively:

Age	Males			Females		
	Overweight	Normal	Underweight	Overweight	Normal	Underweight
30-44	0.0	26.2	38.5	7.9	25.4	52.4
45-59	0.0	15.2	50.0	0.0	3.6	11.1
60+	0.0	5.4	18.8	0.0	0.0	0.0

The percentages of persons with relatively low systolic pressures are seen to rise as relative weight decreases.

[13] The prevalence of overweight of 20 per cent or more among women was, for the three age groups used here, from youngest to oldest: 32.2, 35.5, and 38.9 per cent. Corresponding rates for men were 8.7, 13.4, and 9.8 per cent.

Medical Examination Finding	Males		Females		Both Sexes		Ratio of Observed to Expected
	Observed	Expected	Observed	Expected	Observed	Expected	
1. Chronic Myocarditis	12	7.2	18	10.6	30	17.8	1.7
2. Infected Tonsils, Chronic	9	5.8	13	9.7	22	15.5	1.4
3. Urinary Albumin (All Degrees)	6	2.8	5	5.3	11	8.1	1.4
4. Pulse Pressure Above 50 mm.[2]	50	34.1	104	79.3	154	113.4	1.4
5. Temperature 99.0° or Higher	8	6.0	26	21.2	34	27.2	1.2
6. Lumbago and Backache (Current)	6	3.7	8	7.6	14	11.3	1.2
7. Tonsils Enlarged	3	4.0	19	13.9	22	17.9	1.2
8. Shortness of Breath, Symptom	22	17.1	60	52.0	82	69.1	1.2
9. Urinary Sugar, All Degrees	1	2.5	15	11.2	16	13.7	1.2
10. X-ray, Increased Lung Markings	15	11.5	28	25.6	43	37.1	1.2
11. Urinary Specific Gravity 0.0130+	11	11.0	18	14.4	29	25.4	1.1
12. Dizziness, Symptom	12	12.4	47	41.4	59	53.8	1.1
13. "Rheumatic Pains," Symptom	24	23.6	65	57.1	89	80.7	1.1
14. "Nephritis," Family History	15	14.3	43	38.2	58	52.5	1.1
15. "Heart Trouble," Family History	12	9.3	40	38.3	52	47.6	1.1
16. Teeth, Five or More Missing[3]	41	37.2	93	86.4	134	123.6	1.1
17. Headache, Symptom	15	12.8	50	47.3	65	60.1	1.1
18. Pulse 80+ Per Minute	25	22.6	78	75.7	103	98.3	1.0
19. Cardiac Pain, Symptom	10	8.3	30	30.1	40	38.4	1.0
20. Scarlet Fever, Past History	13	9.9	26	27.8	39	37.7	1.0
21. Marital Status—Married	39	39.6	88	85.3	127	124.9	1.0
22. No Prior City Residence	27	28.2	71	68.8	98	97.0	1.0
23. Economic Status Above Average	34	33.8	70	71.5	104	105.3	1.0
24. Rural as Opposed to Village Residence	28	28.5	50	52.4	78	80.9	1.0
25. Chronic Constipation, Symptom	14	13.0	52	56.9	66	69.9	0.9
26. Tonsils Buried	21	18.8	26	31.6	47	50.4	0.9
27. Thyroid, Diffuse or Nodular Enlargement	—	—	10	10.8	—	—	0.9
28. Frequent Coughs or Colds, History	9	11.9	25	27.1	34	39.0	0.9
29. Upper Respiratory Infections, Exclusive of Tonsils	5	7.9	7	6.2	12	14.1	0.8
30. Chronic Bronchitis, Diagnosed	9	8.4	7	10.8	16	19.2	0.8
31. Pneumonia, Past History	11	13.2	11	13.9	22	27.1	0.8
32. Tuberculosis, Active, Arrested, Suspected	7	8.4	14	18.5	21	26.9	0.8

[1] The differences between expected and observed in this series are not in general statistically significant, and conclusions drawn from them are subject to reservations noted in the text.

[2] Consistent excess in all age groups of both sexes.

Table 6. Observed number of persons found to have systolic blood pressures of 150 mm. or more, with specified finding and expected number (corrected for age) on the basis of rates from the total examined sample.[1]

numbers for these other findings by sex. The expected numbers were obtained by applying the age and sex specific rates[14] for the

[14] Many of these age and sex specific rates have been presented in the detailed study of prevalence for the total sample. *See* Wheeler, *op. cit.*, 1938. The numbers examined for *both* blood pressure and the specified condition were sometimes slightly less than the figures in Table 2.

various findings in the total sample to the smaller number of individuals of the corresponding age and sex in the elevated pressure group. Totals for each sex only are presented in Table 6, and the ratio of observed to expected is shown in the final column. In reference to this table, it is important to keep in mind that small variations in the observed cases, quite within the limits of chance, will cause marked changes in the place of any specified condition in the table. The numerical rating is, therefore, chiefly for convenience in reference. Despite the lack of statistical significance for most of the differences between expected and observed numbers, however, this table suggests a number of relationships, especially where groups of allied conditions are considered. Several well-established relationships are indicated, such as those between high blood pressure and myocarditis (1), elevated pulse pressure (4), and glycosuria (9). The common symptoms of dizziness (12), headache (17), and cardiac pain (19), are relatively low, however, as are also family history of nephritis (14) and heart trouble (15).[25] Past or present environmental factors (22 and 24) or economic factors (23) were signally unrelated. Perhaps the most consistent group, however, is that of respiratory conditions (28-32) whose expectancy seems uniformly to exceed the observed.

Tonsillar data are proverbially difficult to interpret and the varying locations of infected (2), enlarged (7), and buried (26) tonsils are cases in point. It may be that these various aspects of tonsillar pathology have varying relations to hypertension but it cannot be overstressed that only very tentative conclusions can be drawn from these and other data in this table.

CONCLUSIONS

Systolic blood pressure readings of 160 mm. or more were en-

[25] These data are not, however, conclusive because they relate to such history in siblings, if any, and parents of the examined patient. That a more detailed analysis of actual rates among close relatives might reveal a really significant relationship is indicated by the not uncommon finding of elevated pressure in siblings whose parents died of nephritis, cerebral hemorrhage, or heart trouble and by the occasional finding of elevated systolic pressures among one or more children in families where both parents showed high blood pressure.

countered in nearly 10 per cent of males and in 17 per cent of females above the age of five years in a series of examinations made in a rural area. The figure is considerably higher than the 3-6 per cent finding of Riseman and Weiss[28] for patients seen in an urban hospital outpatient service, and possible selective factors in the examined sample are discussed.

An intensive study of factors associated with "elevated blood pressure" (150 mm. or more) was undertaken, and it was found that the data of the present sample add further evidence for the opinion that this condition is more prevalent among females than among males after the age of thirty years. They also indicate that the difference in prevalence between the two sexes is, in part, related to the more frequent occurrence of overweight among females. This conclusion is, however, based upon the assumption that there is no substantial error in the measurement of blood pressure in overweight persons.

A number of other medical examination findings are shown to be associated to some extent with elevated blood pressure, but the significance of these relationships cannot be determined with the present limited data.

[28] Riseman, J. E. F. and Weiss, Soma: The Age and Sex Incidence of Arterial Hypertension. *American Heart Journal,* December, 1929, v, No. 2, p. 172.

ANNOTATIONS

OUTSTANDING BOOKS ON POPULATION PROBLEMS RELEASED IN 1938

THE year 1938 yielded a bountiful crop of books on population problems. In confining this annotation to publications released under the respective auspices of four organizations, there is no intention of minimizing the importance of other published studies.

Perhaps of chief interest during the year was the release of THE PROBLEMS OF A CHANGING POPULATION,[1] a report of the Committee on Population Problems to the National Resources Committee. As the title implies, this volume presents a broad, and yet a detailed, account of the crucial situations with respect to our present human resources and the outlook for the future. The chapter headings are indicative of the wide scope of the report: the trend of population—economic aspects; regional distribution of economic opportunity; trends in population redistribution; regional and racial differences in reproduction rates; social conditions affecting birth rates; physical characteristics and biological inheritance; health and physical development; social development and education[2] and cultural diversity in American life. Preceding these chapters is a brief statement of the Committee on Population Problems, in which an attempt is made to integrate the outstanding findings and to interpret their significance.

Prior to the release of the above reports was the separate publication of

[1] National Resources Committee: THE PROBLEMS OF A CHANGING POPULATION. Washington, Government Printing Office, 1938, 306 pp. 75 cents. (Obtainable from the Superintendent of Documents, Washington, D. C.).

[2] For another development of this subject, *see:* The Advisory Committee on Education. REPORT OF THE COMMITTEE. Washington, Government Printing Office, 1938, 243 pp. 35 cents. (Obtainable from the Superintendent of Documents, Washington, D. C.).

three brochures POPULATION STATISTICS:[3] (1) National Data, (2) State Data, and (3) Urban Data. These volumes furnish in detailed form some of the data collected for THE PROBLEMS OF A CHANGING POPULATION, but their content is not confined to such materials.

Two research memoranda, sponsored by the Social Science Research Council, and released in 1938 under the authorship of Dorothy S. Thomas and Rupert B. Vance, represent a continuation of the Council's long-standing interest in problems of migration. Dr. Thomas' report, RESEARCH MEMORANDUM ON MIGRATION DIFFERENTIALS,[4] is a critical appraisal of existing factual material on the subject of selective migration. The author has drawn upon foreign and domestic materials and has presented evidence of a fairly uniform pattern of selection in so far as age, sex, and marital status of migrants are concerned. According to her report, the evidence of selection with regard to physical and mental health, intelligence, occupation, and motivation and assimilation is far more fragmentary. Descriptions of several of the latter type of studies are presented in detail, together with criticisms of results and techniques, and suggestions for future approaches.

For a companion volume to the above, the Council commissioned Dr. Vance to examine the research opportunities and needs within the field of population redistribution. The report, RESEARCH MEMORANDUM ON POPULATION REDISTRIBUTION WITHIN THE UNITED STATES,[5] materialized in 1938. The author was peculiarly fitted for this report by virtue of his previous participation in the investigation by Goodrich and associates which culminated in MIGRATION AND ECONOMIC OPPORTUNITY.[6] In approaching his task Dr. Vance considered contrasting areas of economic opportunity, differential population increase, population and changing

[3] National Resources Committee: POPULATION STATISTICS. 1. National Data; 2. State Data; and 3. Urban Data. Washington, Government Printing Office, 1937, 107 pp., 67 pp., and 52 pp. respectively. 30, 25, and 15 cents, respectively. (Obtainable from the Superintendent of Documents, Washington, D. C.).

[4] Thomas, Dorothy S.: RESEARCH MEMORANDUM ON MIGRATION DIFFERENTIALS. New York, Social Science Research Council, 1938, Bulletin 43, 423 pp.

[5] Vance, Rupert B.: RESEARCH MEMORANDUM ON POPULATION REDISTRIBUTION WITHIN THE UNITED STATES. New York, Social Science Research Council, 1938, Bulletin 42, 134 pp.
Attention is also called to Warren S. Thompson: RESEARCH MEMORANDUM ON INTERNAL MIGRATION. New York, Social Science Research Council, 1937, Bulletin 30 of the Council's studies in the social aspects of the depression.

[6] Goodrich, Carter (and others): MIGRATION AND ECONOMIC OPPORTUNITY. Philadelphia, University of Pennsylvania Press, 1936, 763 pp.

economic opportunity, and internal migration and the mobility of the population. His method of treatment is unique and worthy of trial by others. It consists in condensation of statements under the headings of propositions, queries, and [suggested] projects. The volume is therefore a brief and explicit handbook of the accepted interpretations, gaps in the data, and next lines of feasible research.

Similar in purpose to, but more general in scope than, the research memoranda of Thomas and Vance, is P. K. Whelpton's NEEDED POPULATION RESEARCH,[7] prepared under the auspices of the Population Association of America. The central topics considered are population forecasts and estimates, official population statistics, fertility and fecundity, mortality, migration, and optimum size and composition of the population. Throughout, the author views the problems in broad perspective and suggests broad fields of research rather than detailed outlines. The result is a quite readable book and one which students of population can frequently consult with profit.

Prominent in the output of publications during the past years is the collection of papers presented at the International Population Congress, held in Paris in 1937 under the auspices of the International Union for the Scientific Investigation of Population Problems. With some exceptions the papers are published in the language of the individual authors. There is good representation of American contributions. The papers are grouped into eight volumes according to general subjects.[8]

Collectively, the studies published in this country during the past year have served to point up the problems clustering around the rural-urban discrepancies in birth rates—the meager economic opportunities, and hence the meager facilities for education and health in areas where birth rates are highest. The dual situation of population pressure in rural problem areas and low birth rates in cities introduces a set of problems attending migration to cities. Is the migration selective in so far as quality of population is concerned? To what extent do the problems of rural

[7] Whelpton, P. K.: NEEDED POPULATION RESEARCH. Prepared under the auspices of the Population Association of America, 1938, 212 pp. $1.00. (Orders received by the Milbank Memorial Fund.)

[8] CONGRÈS INTERNATIONAL DE LA POPULATION, PARIS, 1937. Paris, Herman et Cie, 1938. 8 volumes: I. GENERAL THEORY OF POPULATION; II. HISTORICAL DEMOGRAPHY; III. STATISTICAL DEMOGRAPHY: General Studies; IV. STATISTICAL DEMOGRAPHY: Special Studies (State of the Population, Migrations); V. STATISTICAL DEMOGRAPHY: Special Studies (Marriage, Fertility, Mortality); VI. DEMOGRAPHY OF FRANCE BEYOND THE SEAS; VII. FACTORS AND CONSEQUENCES OF DEMOGRAPHIC EVOLUTION; VIII. QUALITATIVE POPULATION PROBLEMS.

health, education, and economic opportunity transcend local concern? It is fitting that these questions should be explored by competent students before the inevitable demand for legislative correctives becomes strong.

CLYDE V. KISER

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A CANADIAN STUDY OF HEALTH AND UNEMPLOYMENT[1]

IN the United States there has been a tendency to use the survey method for the study of health in relation to economic factors, although there are isolated studies, such as that of Diehl,[2] in which the clinical method is used. The Canadian approach, as summarized by Marsh and his collaborators, is a comparatively diversified one with emphasis, however, on the clinical approach.

The first three chapters, constituting Part I, review the field covered by the book and the work done in other countries. The publications of Sydenstricker, Falk, Collins, and Perrott are ably summarized, together with the results of the Health and Depression studies.

The next six chapters make up Part II and detail the findings of the clinical examination of a thousand unemployed men, as contrasted with those of a large group of employed men. The reader is given a very adequate basis for interpreting the factual findings here, for the characteristics of the sample are well presented, many sources of bias eliminated and such as could not be avoided are indicated so clearly that critical comment on the adequacy of the sample and the comparability of the control group could be taken from the authors. Part III takes up the results of examinations of a smaller group of unemployed young men between 14 and 18 years of age, studied with respect to the prevalence of defects in different socio-economic groups.

Part IV considers data assembled on the family as a whole from social agency records, available data on children, with particular reference to nutritional status, and minimum standard budgets. A final section, Part

[1] A REVIEW OF HEALTH AND UNEMPLOYMENT by Leonard C. Marsh in collaboration with A. Grant Fleming and C. F. Blackler. Oxford University Press, 1938.

[2] Diehl, H. S.: Physical Condition and Unemployment. *Public Health Reports*, November 15, 1935, Vol. 50, Part 2, p. 1610.

v, surveys medical services for the indigent and unemployed in various sections of Canada, emphasizes the uneven distribution of these and suggests needed reforms.

The chapters on medical findings in the unemployed and employed groups support, with reservations, the thesis that ill health and unemployment are related. The reader is left with the impression that the routine medical examination approach offers at present a qualitative test of the existence of this relationship rather than a quantitative measure of it. For more extensive results and to amplify the conclusions which can be drawn from the data it would seem advisable to modify the examination or to supplement it somewhat. A useful form of supplement is inferred in Chapter 10 where observations on the mental status and the home environment of the unemployed are made, and the impression given that an intensive study of these factors would have an important bearing on the problem of unemployment and health.

Comments on the somewhat limited returns from the method of approach used in this study should not, however, detract from the value of such findings as are obtained. One of the advantages of this approach—and undoubtedly the reason it was used here—is that quite factual data are obtained. It is noteworthy that the results in general tally with those obtained by other methods and that the recommendations of this group of investigators are also in line with those growing out of similar independent studies in the United States.

In addition to the presentation of useful data, the authors make a contribution in the form of temperate and judicial evaluation: in fact, they introduce their subject as "an essay in interpretation" and as a plea for further research.

RALPH E. WHEELER

ERRATUM

A Study of Mortality Among Individuals with Active Pulmonary Tuberculosis, by Jean Downes

The Milbank Memorial Fund *Quarterly,* Vol. xvi, No. 3, July, 1938, page 308, footnote 10, Column 3 of the table, *Differences:*

for 5.1±0.55 please read 5.1±0.88
for 37.6±0.90 please read 37.6±1.77